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September 15, 1925
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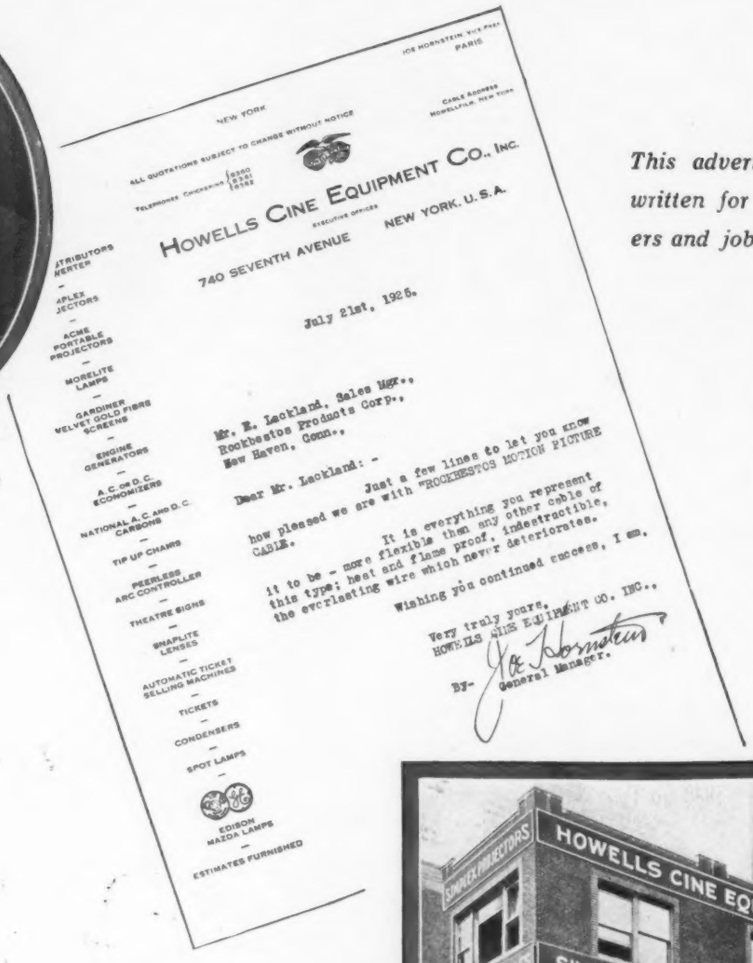
Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity
IN THE ELEVEN WESTERN STATES

ROCKBESTOS

–the asbestos covered wire

Mr. Joe Hornstein
Gen. Manager of Howells
Cine Equip. Co., Inc.



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July 21st, 1926.

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LOS ANGELES SAN FRANCISCO

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Oct. 1 Issue Will Contain Reports of Two Important Conventions

THE forthcoming Oct. 1 issue of the Journal will be of more than passing interest. Two events of considerable importance to the electrical industry in the West will have taken place: namely, the annual meeting of the Rocky Mountain Division of the National Electric Light Association at Glenwood Springs, Colo., and at Seattle, Wash., the Pacific Coast convention of the American Institute of Electrical Engineers.

Advance copies of the programs indicate that matters under discussion at these two meetings will add materially to the story of progress of the electrical industry.

In order that its readers may have the advantage of first-hand information as to what takes place at these two meetings the publishers of the Journal of Electricity have arranged to have George C. Tenney, managing editor of the Journal, attend and report the Glenwood Springs conference, while G. R. Henninger, associate editor, will perform the same function at the sessions of the American Institute of Electrical Engineers. Thus through this service those who are unable to attend the conventions may see everything that happened through the eyes of trained observers, while those who do attend live over again the events in which they took part.

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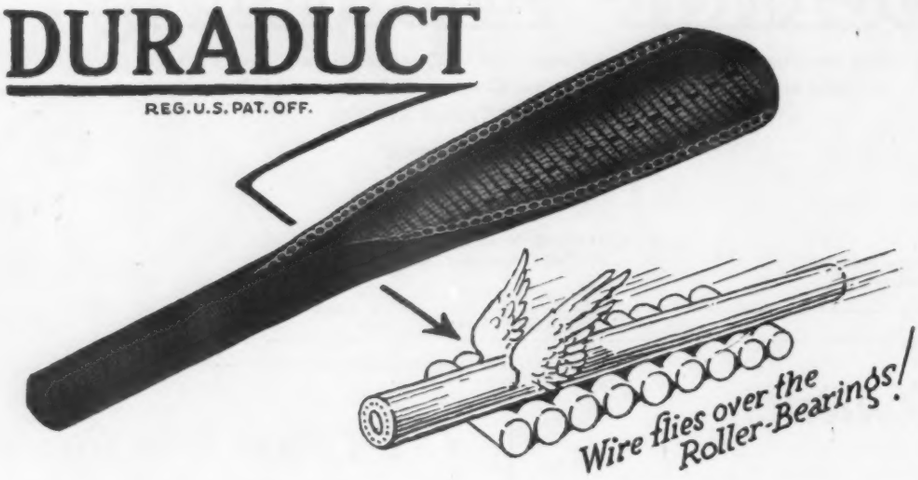

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EDITORIAL

Arizona Once More Blocks Progress on the Colorado River Problem

ONCE again efforts to settle amicably the differences relative to the utilization of the resources of the Colorado River have been upset by Arizona. A tri-state conference between representatives of California, Nevada and Arizona, meeting in Phoenix Aug. 17, 1925, adjourned after less than a day's deliberations when the position of Arizona was presented by Governor Hunt. On another page of this issue is the governor's pronouncement of the stand of the state whose arbitrary attitude has proved a stumbling block whenever any attempt has been made to arrive at a settlement of the rights of the Colorado River basin states to the water and power resources of the stream.

Governor Hunt begins by attacking the terms of the Colorado River compact that was ratified by six states but opposed by Arizona. He cites as errors in the compact that it does not apportion the waters between states but between basins; that the upper basin states would receive more than their just share of the water; that no provisions have been made to prevent water stored in the United States from being utilized in Mexico. Under the terms of the compact he charges that the upper basin states and California will achieve wealth, economic security and the assurance of the continuance of these benefits, while Arizona and Nevada will receive nothing. In one breath he says that Arizona does not know what she wants from the Colorado River and in the next that the state reserves the right to derive revenue from power developed on the stream within its borders and utilized in other states. A careful study of his address will reveal other equally startling statements.

We are inclined to believe that the pronouncements made by Governor Hunt do not represent the true sentiment of the people of Arizona. We remember that each time an endeavor has been made to reach an agreement on the Colorado River problem it has been the man in the gubernatorial chair who has been responsible for its failure. Surely there is a citizen among the broadminded and progressive business men of the state with sufficient interest in its affairs to accept the gubernatorial nomination in opposition to the incumbent. A governor will be elected in 1926. Let us hope that a candidate will be elected who will recognize that an early settlement of the Colorado River problem will mean much for the future of Arizona.

Electric Range Is Out of Specialty Class

CONSIDER the little snowball—a slight push starts it rolling and in a short while it is a thing of great size and mighty import. The same thought applies to the merchandising activities of the California central stations. In the few weeks since the announcement of the load-building campaigns of the power companies of that state the industry slowly has been awakening to the importance of these sales drives. The greater activity is being displayed by the so-called non-electrical outlets. Keen merchants such as furniture dealers, department stores and household furnishing goods stores rapidly are realizing the dollars and cents value of the advertising and sales work which the central stations are doing. This realization is reflected in the amount of electrical appliance advertising appearing in the daily newspapers. Full-page advertisements for electric ranges over the signature of a furniture dealer have been a rarity in the past, but in several California cities they have made their appearance during the last fortnight. As was the case with the iron, the vacuum cleaner and the waching machine, merchants have realized that the electric range, a specialty yesterday, has become a standard commodity almost over night due in large measure to the intensive pioneering work of the central stations.

Sell Appliances Like Bathrooms— A Complete Job Included in Mortgage

A CHALLENGE to the electrical industry in the sale of appliances is made in an editorial in the current issue of "Electrical Merchandising". There is much food for thought in the statement that the industry is lagging far behind the growth of the household market and that more homes are being wired each year than are being equipped adequately with appliances. A better, faster way must be found of selling appliances to the public. And the answer, according to the editorial, is to pattern the efforts of the industry after the plan used by the bathroom salesman—sell a complete electrical installation with the heavy appliances inclusive under the mortgage. More specifically the plan outlined is:

"1. Let us sell not just single appliances, but complete equipment. Let us prove the practical and personal advantages of meeting present conditions of cost and labor in the home, by doing the housework electrically.

"2. Let us show each household how the mort-

gage money can be made to pay for the heavy equipment—clothes-washer, ironer, dish-washer, kitchen motor, refrigerator, and where the rate permits—a range and water-heater—if these are screwed fast and permanently installed when the house is built or bought.

"3. Let us also figure for the customer how to make the regular household budget pay for the auxiliary equipment—the vacuum cleaner, sewing machine, fan, toaster, percolator, waffle iron, heat pad and the rest,—by setting up an easy-payment contract and a regular schedule of appliances, with a fixed appropriation of so much a month."

Courageous selling and a greater realization of the household market are the things which will sell complete electrical equipment—a $1,500 order for each home.

Denver Cooperative League Begins Fifth Year with Bright Prospects

DENVER'S electrical industry may be justly proud of the four-year record of its Electrical Cooperative League. This service organization, one of the half-dozen pioneers in the field, has passed its fourth milestone and is entering upon its fifth year with bright prospects for even greater success than it has met in the past.

Electrical men in cities where other cooperative organizations are functioning and those in districts which should support such leagues, but which do not do so will benefit from a careful study of the fourth annual report of the Denver League that has just been issued. In its effort to place the electrical industry, including its utilities, before the public in such a manner as to inspire understanding, confidence and good will, the league has learned from experience the advisability of development along certain definite lines. The code which it has established in the light of its past experience includes the following:

1. Serving the public as a bureau of electrical information—a consulting service without charge.

2. The maintenance of a staff to work directly with architects, builders, owners, and others in advising on electrical installations in all types of buildings.

3. To work toward the continual improvement and enforcement of electric wiring rules.

4. To explain, demonstrate and emphasize the necessity and value of proper lighting.

5. The encouragement and co-ordination of electrical exhibits.

6. The establishment of electric homes in the most advantageous places.

7. The development of teamwork throughout the industry by get-together meetings and other social activities.

8. The establishment of a consciousness in the mind of every electrical man in the community that he cannot be an ardent electrical advocate until he himself practices the precepts of the industry.

9. The extension of membership in the league to other interests participating in the benefits of its work, including such other territory outside of Denver as can be served profitably.

10. The education of the consumer to the value of the league and the whole-hearted willingness and ability of the industry which it represents.

With such a code to guide its operations and with the electrical industry and the public cooperating harmoniously, there cannot help but be engendered a spirit of service in the Denver electrical industry and a full realization that even more progress can be attained in future years.

Electric Appliances Bring Longevity to Women

THE world at large, and especially the feminine portion of it, is busily engaged in the quest of perpetual youth. The mythical Fountain of Youth with which Ponce de Leon regaled the effete hangerson of European court circles some centuries ago finds its counterpart in the many nostrums of one kind or another advertised in publications of general circulation.

"How to be young, though old," is the question that will be asked eagerly, pathetically, as long as the human race endures. The psychopath talks learnedly about "complexes", the diagnostician descants upon the mysteries of high blood pressure, arteriosclerosis, ductless glands and other mysterious human ailments, and all to no purpose whatever unless we can find a way to prevent the waste and destruction of our tissues and arterial system before their time.

It is the ounce of prevention that counts. The work of General Leonard Wood in Cuba and that of General Gorgas in the Canal Zone in preventing the germination of disease-bearing bacilli did more for humanity in a short time, and did it more effectively, than a whole list of alleged cures.

All of this is a greater argument for the electric servant than all of the rest of them put together. Who cares whether a candle costs less than an incandescent lamp? What boots it whether a coal fire in a range costs less than electrical energy for cooking? Shall we ask our wives to bend over a wash tub as our grandmothers used to? We hope not.

Here's to the electrical servant, that does our work efficiently, cheaply, cleanly, while we and our wives partake of the joys of life in a measure hitherto impossible. Abraham Lincoln's mother died at thirty-five. That was before the days of the electrical servant.

Sell Refrigeration Not the Refrigerant

SULPHUR Dioxide—a colorless gas, SO_2, having a pungent suffocating odor, produced by the burning of sulphur, etc. It is used in making sulphuric acid, as a bleaching agent, as a disinfectant and antiseptic, etc.

Methyl Chloride—a colorless sweet smelling gas, CH_3Cl, obtained by action of hydrochloric acid on

methyl alcohol. It is easily liquefied by cold or pressure and is used as a refrigerant and local anaesthetic.

Thus are defined in Webster's New International Dictionary two of the gases used in the domestic refrigeration process. Examination of the report of the Electric Refrigeration Committee of the Commercial Section of the N.E.L.A. for 1924-5 reveals that other gases used as refrigerants in domestic machines are ammonia, ethyl chloride, butane and isobutane, and the definitions of these others would sound as innocent as the above and be as lacking in human interest.

Shorn of embellishment, stripped of any hint of passion or prejudice, colorless as the gases they describe, these bare facts do not contain eloquence to fire the imagination or stir the soul. But what a debate could be staged by the champions of any of these gases on the relative merits as refrigerants! With what fervor could each contender for commercial prestige extol the properties of the gas used in the machine he sells, and with what rancor could he attribute dire properties to the gases used by his competitors! And yet all these gases have proved efficient; all are safely handled.

Let us enter a plea for a broadminded selling policy among refrigerator competitors. The old platitude, "Every knock is a boost," as applied to selling a competitive article, is a fairly well established axiom and might act as a deterrent when the temptation is strong to knock the other fellow's machine. But let us go further and point out that every seed of fear of any of the commonly used refrigerants sown in the mind of a prospect may ripen into a distrust of all refrigerants, thus setting up a sales resistance to all refrigeration machines. In the interest of volume of sales, which will benefit the entire electrical industry, let us reiterate the plea that **refrigeration** be sold—not the **refrigerant.**

Make Service, Not Price, the Basis of Wiring Jobs

IT is interesting to observe the unanimity with which the foremost students of selling and selling methods condemn the emphasizing of the "price" basis as of paramount importance in selling goods. Some years ago a man who achieved success as a merchant said: "There are but two kinds of competition, price and service". Price competition there always will be, but modern thought has brought about a "soft-pedaling" of price, with the service idea as a major theme.

Observers of modern advertising copy will note a conspicuous absence of published prices. "Tell what it will do for the purchaser and how well it will be done," is the present-day theme, while the price question is left as the last item to be considered.

An automobile costs more than a bicycle; a horse and buggy furnish transportation of a sort; an oil lamp will give light, to be sure, but—what has become of them all? Certainly nothing short of sheer stupidity can be the excuse for offering goods of any kind with nothing in their favor but what appears to be a low price.

The electrical contractor who rushes to the architect or owner with a set of wiring plans to tell him how he can "save" so much money by leaving out this or that is simply standing in his own light, as well as that of the house-owner, who will find a material stumbling block in his way when he wants to enjoy in fullest measure the benefits of electrical service, and the entire industry suffers as well.

In his work the electrical contractor of vision recognizes both an obligation and an opportunity—an obligation to do a first-class job with resultant satisfaction to the customer; an opportunity to build for his own future.

A good suit of clothes is cheap. A low-priced suit of shoddy is dear. An adequate wiring job with a sufficiency of outlets is cheap in terms of service, comfort and satisfaction to all concerned. Don't talk price; talk service.

DISCUSSION

Official Gives Status of Logan Municipal Electric Plant

To the Editor:

Sir:—I have read with some interest an account pertaining to the municipal electric plant at Logan City, Utah, as published in the Journal issue of Aug. 15, 1925. This was a movement set on foot by a few citizens to dispose of the plant and the report a brief of which you published, is but the first chapter of this interesting subject.

After the report of the special committee was reviewed by a majority of the chamber's board of directors, a meeting of the entire Chamber of Commerce was called on Aug. 6, at which time the electric light matter was considered and discussed at considerable length and it was finally decided by a vote of 83 to 45 to rescind the action of the board of directors and reject the report. In the discussion of this question it was brought out that there was considerable prejudice against the plant written into the report. Ways and means were discussed looking to supplying the municipal plant with auxiliary power in times of water shortage and accident.

On Aug. 28 an enthusiastic meeting was held at which over two hundred taxpayers were present, and organized a "Logan City Welfare Association," committed to the proposition of protecting Logan City and its interests, and especially the electric light plant, hoping to set at rest once and forever this idea of selling to public utilities.

This, Mr. Editor, is the second and last chapter of our little story, and trust you will give it space so that the industry might know that Logan, Utah, stands 85 per cent strong for her municipal plant.

LOGAN CITY CORPORATION,
H. C. MAUGHAN,
Supt. Electric Light Plant

Logan, Utah,
Aug. 31, 1925.

THE Security Apartments which recently were erected in Hollywood, Calif., by the Hollivar Holding Corporation, are entirely electric. They are equipped with electric air heaters, water heaters, ranges, refrigerators, and dishwashers. There are 180 apartments in the building. The sale of heavy-duty electrical appliances was probably the largest ever made in California. The total connected load in the apartments will amount to approximately 4,380 hp.

Arizona's Viewpoint on the Colorado River

By George W. P. Hunt*
Governor of the State of Arizona

ON Aug. 17, 1925 a meeting was held in Phoenix between representtatives of California, Nevada and Arizona in an effort to arrive at some settlement regarding the development of the Colorado River. The meeting was adjourned following the pronouncement of Arizona's stand on the question by Governor Hunt. The governor's statements are presented herewith.

THIS conference has been called in an endeavor to find a remedy for and to reconcile some of the defects contained in the Colorado River compact, which was negotiated at Santa Fe, N. M. This compact purports to allocate the waters of the Colorado River in accordance with the terms of a uniform law passed by Congress and the seven states in the Colorado River basin. By referring to the law you will ascertain the fact that it authorizes a compact apportioning the water of the Colorado River "between the states."

The first fundamental error in the compact is that it does not apportion the water as authorized by law "between the states," but between arbitrary divisions called basins, the "upper" and the "lower" basins, and this was done without consideration of conditions existing in the two arbitrary basins created. Under the arbitrary conditions established for the divisions of the water, Arizona, due to economic conditions, is subject to the same difficulties as the upper basin states and by signing the compact would, in competition with California, be signing away all her rights and hopes for future development.

The second fundamental error in the compact is that all of the water that the upper basin states can ever use (and some eminent engineers claim more water than they can ever use) has been apportioned to them, while insufficient water was allocated to the lower basin to irrigate all of the lands susceptible to feasible development and in return for this advantage in allocation of water they give nothing to the lower basin either in recognition of rights, of storage facilities or otherwise, unless we except possible freedom from legislative and departmental coercion and threatened law suits.

The third defect in the compact is that no provision is made to prevent water stored in the United States, when it is released and the low water flow increased, from being applied to Mexican lands and possible water rights acquired in that country.

The fourth defect is that in the allocation of water the upper basin states will be served from the normal flow of the river, while the lower basin must depend on storage, and no allowance is made for evaporation losses which will result to the lower basin from the stored water.

Other defects exist which I shall touch on later.

What is the reason for any compact being negotiated which sets aside the present well established and defined water laws which govern the utilization of water in all of the states of the basin and the principles of which were held by the United States Supreme Court to govern as between the states in the basin? The only answer that can be made logically and truthfully is that it is dictated by the farsighted business acumen of some of the states in the basin which are endeavoring to secure for use, in the distant future, rights which they do not now possess under the law. The upper basin states are manifesting no altruism in demanding a compact. They do not take the position that it is immaterial where development is undertaken so long as it is in the United States. They are demanding all that they can get for their political subdivisions or states. Why should we not do likewise?

Economic law may be harsh, but it is the only law that governs. We are told by eminent authorities that $150,000,000 in unearned increment will become attached to the lands of the Imperial Valley as soon as adequate storage facilities are provided to insure a steady supply of water for irrigation and flood control; and that additional hundreds of millions or perhaps billions of value in unearned increment will accrue to southern California municipalities and lands when an abundance of electrical energy is made available. Thus, under the terms of the Colorado River compact, the four upper basin states and California achieve wealth, economic security and the assurance of the continuation of these benefits in perpetuity.

What of Arizona and Nevada, the remaining two states in the basin? We are told, quoting ex-Governor Boyle, that Nevada can possibly utilize 10,000 hp. from the Colorado River at this time; that they may eventually utilize 100,000 hp. and that they may irrigate not to exceed 80,000 acres of land. Mr. Weymouth and Mr. Davis, former chief engineers of the United States Bureau of Reclamation, state 3,000 and 4,000, respectively.

*Excerpts from a speech before the Tri-State Colorado River Conference, Phoenix, Ariz., Aug. 17, 1925.

You ask about Arizona? What does she want from the Colorado River? I say, frankly, that at this time all we ask for, if the economic laws are to be set aside and a treaty negotiated, is that Arizona receive protection of her rights, including her future development. If you ask me specifically what we want, I reply to you frankly, without any apology, that we do not know, because we have not sufficient data available to determine what it is practical to develop.

Arizona is in the position, if the present water law remains undisturbed and unimpaired, of asking nothing. We are fully satisfied with the present laws as interpreted by the United States Supreme Court. We are fully able, under present laws, to protect our interests from all of the other six states in the basin and from Mexico. We do not fear development in California or in the upper basin if the law of priorities, based upon appropriation for beneficial use, remains in full effect. But if that law is to be disturbed, modified or set aside, we have immediate cause for alarm. The proposal to set the law aside does not come from us.

We had not been particularly interested in the immediate development of the Colorado River up to the time the compact was discussed. It is only thirteen years ago since we obtained statehood. We have been developing our resources within the interior of this state. We think we have made tremendous strides since 1912, considering our small population and taxable wealth in that our percentage of increase in population exceeded that of any other state in the Union during that period. We were satisfied to permit the Colorado River to remain a potential asset until we were ready to utilize the same.

I have said that we do not know in detail what Arizona wants from the Colorado River. We do not know because we have very few facts. Under the Kincaid Act, passed by Congress, the United States spent over $2,000,000 in the vicinity of Boulder Canyon and practically none elsewhere on the river. There is some testimony that the Imperial Valley irrigation district has spent half a million dollars in connection with the proposed Boulder Canyon project, and we have no information as to how much money southern California municipalities and the state of Nevada and other interests have spent in this connection. The lack of information and data in regard to any other portion of the river, other than that at Boulder Canyon, is very succinctly stated by Col. William Kelley, chief engineer of the United States Federal Power Commission, as follows:

"The need for more facts is the rather astounding conclusion one must reach from study of the data at hand. While hundreds of thousands of dollars have been expended on intensive investigation at Boulder and Black Canyons, the various dam sites between Boulder and Diamond Creek are untested, as is also the site at Mohave Canyon. Drilling at these sites and sufficient investigation and study to permit estimates of comparable accuracy to be made for each are necessary before a satisfactory conclusion can be reached."

When the Colorado River compact was negotiated the representatives of the state of Arizona had no material facts as to the possibilities of development in this state, unless the information as contained in the report of Mr. Arthur P. Davis is to be accepted by Arizona as accurate—something we are not willing to accept.

The question may be raised that it is not the fault of the other states that Arizona is not in possession of the facts. Our reply is that Arizona is not asking that the law of priorities based upon appropriation for beneficial use be set aside. Arizona is fully content with that law. We think it is fair, equitable and just. Under the provisions of that law there has been no need for Arizona to be in any hurry about spending money for Colorado River surveys or to fear early development of the Colorado River from any other source, as we spent our money elsewhere where there was more need of it.

Since the Colorado River compact was negotiated, engineers tell us that it is possible to develop additionally from 700,000 to 3,000,000 acres of land in Arizona from the Colorado River. Other engineers accept the data of Mr. Arthur P. Davis which states that it is only practicable to irrigate some 280,000 acres of land, which includes the Yuma project in Arizona, from the Colorado River. We think we have secured sufficient information in the past two years to justify the belief that a considerably greater area in this state can be irrigated from the Colorado River, and we want the water to do it, if further surveys prove it practicable.

In negotiating a treaty concerning the Colorado River we do not see our way clear to allocate, by treaty, any of the waters from Arizona streams as a portion of the main Colorado River. We insist that the laws of Arizona shall govern on the basis of prior appropriation for beneficial use and remain undisturbed on Arizona streams. We grant the same right to Nevada and to California to utilize the waters of all of the streams that originate in their territory, but we decline to dispose of, to other states, by treaty, rights in Arizona streams that can be acquired in no other way. Economic law and self-preservation dictate our policy in this matter.

I think I appreciate fully that you gentlemen did not come to Arizona looking for charity. If Arizona signed the Colorado River compact in its present form we would be signing away our future rights to utilize the resources of the river without recompense. If we have something you want and can utilize, economic justice dictates that it be paid for. I believe Arizona and Nevada have a definite interest in the Colorado River that received no consideration in the compact and little consideration in the discussion concerning it; and that is the right to derive revenue from the power developed by the harnessing of the river within our borders.

I am not fully informed as to how Nevada feels about the matter, but the state of Arizona expects to derive revenue from every unit of electrical energy generated in this state that is utilized in other states. The Colorado River compact does not deal with this question, but the state engineer of California, in a communication addressed to the governor of California, states that the upper basin states have some claim on power that may be developed

in the lower basin. I deny that any such right exists. I repudiate such doctrine. The Colorado River compact gives to the upper basin states rights which they cannot acquire under the law except by putting the water to beneficial use before it is utilized in the lower basin. What do they give in return? Whether the water be apportioned under existing law, or by treaty, when it comes to the Arizona line the upper basin states have lost all title and right to it, and Arizona will conclude no treaty unless that right be fully recognized and established.

Something has been said from time to time about the nationalization of the river; that Arizona is said to have forfeited her rights under the terms of the Enabling Act granting statehood to this state. Efforts have been made to distort the law as it relates to navigation, and alleged rights the federal government might have in a navigable river are used as a basis for discussing nationalization of the river. In this connection I say to you that so long as the courts of this land remain open Arizona anticipates no menace from that direction. We would expect to get from the courts the same rights that New York might.

Arizona asserts that she is a sovereign state with rights equal to those of any other state; that she has jurisdiction over the bed of the streams from high water mark to high water mark within this state and all of the water that flows therein except as title has been acquired under existing law, and that between the states of Nevada and California, where the stream is a border stream the sovereign rights lay between those two states and Arizona and that any rights as to power sites that the federal government may have in the streams are the rights of a proprietor only.

I hope that some day that usurped right of the United States will be challenged and that Arizona may have the opportunity to show in the Supreme Court that when the Congress of the United States made the reservations as to power sites it exceeded its authority in denying admittance of the territory of Arizona to the union of the states, which comprise the United States, on an equal basis with all of the other states.

Arizona asserts that while the federal government, as a proprietor, may own the lands abutting the dam sites and the lands that will be overflowed, the state of Arizona, as a sovereign, owns the land in the bed of the stream upon which the dam will be erected and the water in the stream, and that it reserves the right to tax and derive revenue from any development in the river in whatever manner the law of this state may devise.

In conclusion I believe that any decisions you may reach should first of all stipulate that no treaty allocating the waters of the Colorado River shall be effective until it is fully established between the United States government and the Mexican government that no water rights will accrue to Mexican lands resulting from any storage facilities provided on the Colorado River or any of its tributaries. Second, I believe that all the water that may remain unappropriated for beneficial use, under the terms of the Colorado River compact, by the upper basin, should be the basis of apportionment in the lower basin rather than that the allocation be limited to eight and one-half million acre-feet appropriated by the compact.

At this time Arizona is asked to negotiate and distribute resources from the biggest asset she has because some other sections of the country assert that the immediate development of this asset is imperative to their welfare. We are unprepared to negotiate, but if an adjudication can be worked out that sounds anywhere near fair and equitable to this state I shall be very glad of the same. I stand ready to cooperate with you and to make available any information we possess. I trust that your labors may prove successful.

Comparison Shows Steady Decrease in Price of Electricity

The high cost of living continues to be a favorite topic for discussion, complaint and speculation. Article after article is cited to show the steadily mounting trend. There is one commodity, however, whose cost not only has not joined the upward march but, in comparison with other items, actually has decreased. That commodity is electricity.

The accompanying table, prepared by the Bureau of Labor Statistics and based on a summarization of figures on the increase in the cost of living in thirty-two cities in the United States from 1913 to June, 1925, computed on a 1913 base, shows that while living costs mounted steadily until they reached an increase peak in 1919 and 1920 of 99.3 per cent and 100.4 per cent, respectively, the price of electricity for the same period decreased, the figures for those two years being 7.4 per cent and 4.9 per cent, respectively. Since that time it has decreased in the following percentages: 4.9, 7.4, 8.6, 8.6 and 9.9.

CHANGES IN COST OF LIVING IN THE UNITED STATES, 1913 TO JUNE, 1925

Item of Expenditure	Per cent of increase from 1913 (average) to—											
	Dec. 1914	Dec. 1915	Dec. 1916	Dec. 1917	Dec. 1918	Dec. 1919	Dec. 1920	Dec. 1921	Dec. 1922	Dec. 1923	Dec. 1924	June 1925
Food	5.0	5.0	26.0	57.0	87.0	97.0	78.0	49.9	46.6	50.3	51.5	55.0
Clothing	1.0	4.7	20.0	49.1	105.3	168.7	158.5	84.4	71.5	76.3	71.3	70.6
Housing		1.5	2.3	.1	9.2	25.3	51.1	61.4	61.9	66.5	68.2	67.4
Fuel and Light	1.0	1.0	8.4	24.1	47.9	56.8	94.9	81.1	86.4	84.0	80.5	76.7
House-furnishing goods	4.0	10.6	27.8	50.6	113.6	163.5	185.4	118.0	108.2	122.4	116.0	114.3
Miscellaneous	3.0	7.4	13.3	40.5	65.8	90.2	108.2	106.8	100.5	101.7	101.7	102.7
All items	3.0	5.1	18.3	42.4	74.4	99.3	100.4	74.3	69.5	73.2	72.5	73.5
Electricity*	3.7	6.2	8.6	11.1	6.2	7.4	4.9	4.9	7.4	8.6	8.6	9.9

*This line shows the per cent of decrease in the price of electricity on the dates named as compared with the price in December, 1913. These figures are based on the weighted averages of consumption at the various rates charged.

The Customers' Magazine

By J. Lightbody

Publicity Manager, British Columbia Electric Railway Company, Ltd., Vancouver, B. C.

HOW many power companies have wished for 100 per cent circulation of their consumers with some particular news story or advertisement? The B. C. Electric Railway Company, Ltd., recently has instituted "Utility Topics," a bi-monthly customers' magazine which gives this service. The reasons for the establishment of the magazine and some of the results which have developed are described in this article.

EVERY medium of advertising has some merits. The newspaper, the billboard, the car card, direct mail—each of these classes has particular advantages for certain products and certain kinds of advertising. There is another medium, available to power companies as to no other industry, that is as yet almost undeveloped and presents 100 per cent perfect circulation and a high probability of being read. It is the customers' magazine. If its character is determined properly and if it is well conducted, the customers' magazine will not only be effective in fostering good will for the power company but also will be an excellent medium for advertising the company's services and merchandise.

It was after a thorough investigation into the cost and the merits of such a publication that the British Columbia Electric Railway Company started "Utility Topics" at the beginning of 1925.

One of the factors which weighed with the company was the success of another publication begun nine years ago for street car patrons. "The Buzzer," as it is called, is published weekly and has had a marked effect in improving public relations. It gave direct contact with car riders as no other medium could. Why then should a similar success not be made with a publication to 65,000 light and power or gas customers?

The size decided upon was 5 x 6½ in.—small enough to fit a pocket and easy to mail. Each issue contains 16 pages, and it is published every other month. The reason for this was to enable the machinery of publication to get into smooth running order before more frequent publication was adopted.

As all light and gas bills are delivered, the distribution of "Utility Topics" costs comparatively little as the magazine is handled by the same men. It has the effect, however, of spreading the distribution over the entire month which is no drawback, requiring only some adjustment in editing.

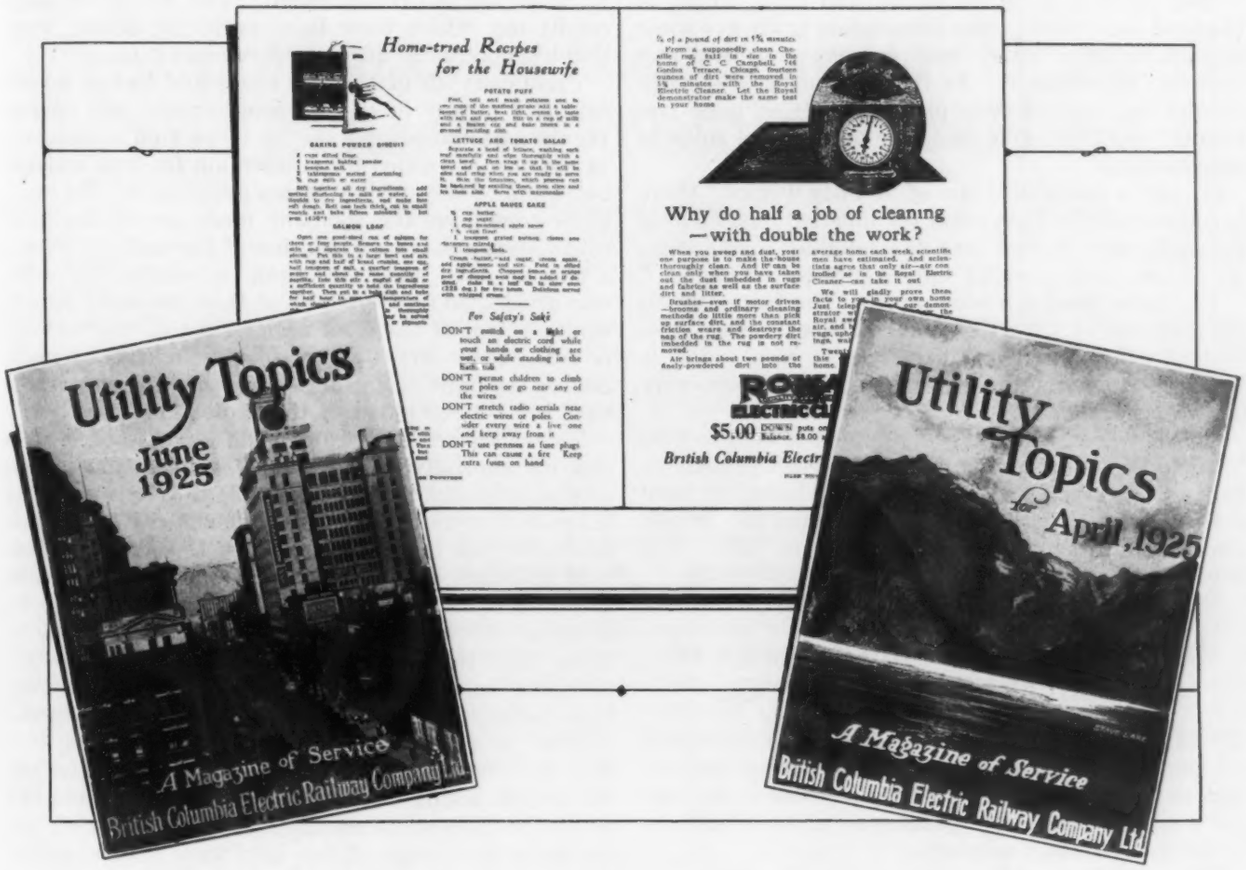
The arguments in favor of a customers' magazine as viewed by the company are somewhat as follows:

1. We had a complete mailing list of every house with which we did business and as our territory was practically 100 per cent wired, no one would not receive a copy. This mailing list was too valuable not to use. Other concerns would give thousands of dollars for it and indeed many applications had been received for the use of at least portions. As our gas territory is not so large as our electric, portions of the magazine devoted to gas might be read in towns where it would have no effect. On the other hand, it would circulate among homes which were in the gas area but which did not use gas service, thus promoting an extension of gas service. On the whole, there was no waste circulation regarding the electric service and comparatively little regarding the gas service.

2. Our customers' magazine has a larger circulation than any other publication in our territory. This stands to reason when a copy goes to practically every home. Again, this will be true of every other power company, at least in the West, where the percentage of wired houses is so high. There will seldom be found a newspaper with so saturated a territory and yet with no waste circulation outside the area in which the power company does business.

3. It gave us a medium of our own in which we could say what we liked and do what we liked. Previously if we wanted to have published a story on lighting the home, despite the fact that it was of public interest and not propaganda, we had to coax some editor to run it. If the newspaper published no suitable page, it was not run. With a customers' magazine, we are independent. In time we probably will make editors realize that what we are printing is of interest to **their** readers, and they will print similar stories more readily.

4. From the beginning it was our plan to make our magazine a household one, with a particular appeal to women. Our problem was one of merchandising rather than obtaining good will. We conduct our public relations publicity in other mediums. That, of course, is a question for the individual company to determine. In our case, we felt that a magazine could be used best for selling services or merchandise. The national magazines with the largest circulations with possibly two exceptions, are all women's magazines. Nor were there in our territory any local women's publications. Therefore, it seemed to us that a magazine largely of interest to women would find a place and be read. This appeared to be particularly reasonable when most of the appliances sold by electric or gas com-


Home-tried Recipes for the Housewife
Why do half a job of cleaning —with double the work?
Utility Topics
June 1925
A Magazine of Service
British Columbia Electric Railway Company Ltd.
Utility Topics
April, 1925
A Magazine of Service
British Columbia Electric Railway Company Ltd.

Attractive covers and items of appeal to the housewife are among the special features of the B.C. Electric Railway Company's magazine

panies are for women and bought by women. That does not mean that subjects of interest to men or of general interest are omitted. A proper leaven of articles and news is attempted.

5. A great deal of information about a public utility company and particularly about gas and electric services has a high news value. The public is interested in hearing about these essential services, which have a quasi-public character. Electricity and gas enter into the daily lives of everyone in so intimate a way that they interest everyone. A public utility company should tell its customers the best way to use its electricity or gas; the best way to light their homes; the best way to cook, clean, wash and do the hundred and one other jobs that these services do. Not only this, but the use of these services calls for some knowledge on the part of the customer. If a fuse blows out or a gas burner becomes clogged, the company is apt to be blamed. For this reason, "Utility Topics" discusses these subjects and is designated "A Magazine of Service." While advertising was the underlying motive of its publication, it had to justify itself by the information contained in its news columns, just as any newspaper or magazine must.

6. Previous to publishing "Utility Topics," our company sent circulars and broadsides on one appliance or another nearly every month. To some extent the customers' magazine has curtailed this. We still send our advertising broadsides, but it is not necessary to do so in such numbers. Our magazine goes to 65,000 homes while our circulars seldom went to more than 30,000. Now we can reduce the circulars to the most likely prospects and leave the general circulation to the magazine.

In editing "Utility Topics" we determined to maintain a fair proportion of reading matter to advertising and for the most part to make advertising pages different in appearance from reading matter pages. We run from 25 to 35 per cent advertising. Through the reading matter stories suggesting the purchase of appliances may be inserted, but for the most part advertising is made to look like advertising. We don't want to be accused of fooling our readers.

Each page or fraction of a page of advertising is charged against the particular department using it on a basis of cost. Reading matter is also charged on the same basis where it refers to a particular subject. Reading matter of a general nature is charged to the electrical and gas departments somewhat in proportion to the number of customers they each have.

There is always a pictorial page in the center of the issue using pictures of general as well as company interest. A story of general civic interest may be printed at the beginning. At any rate, the leading story must be of interest and must not have any tinge of propaganda. The last two pages are always advertisements. A page of recipes generally is run near the end.

The front page is an entire half-tone, which is changed each issue. The illustration is always some attractive scene which may or may not have any company significance. As there is plenty of scenery around the hydroelectric plants, the front page frequently portrays some company property in suitable surroundings.

Owing to the tabloid size of "Utility Topics," there is comparatively little room for illustrations. These generally are worked into the hand-lettered heads, which also give a snappy appearance to the pages.

The paper used is a book stock. The factor which prevents use of a heavier grade of stock is the question of delivery. The bill deliverers would find it impossible to carry their quota if a heavy stock were used.

On the whole, we have every reason to believe that "Utility Topics" is giving us excellent value in advertising. We reach 65,000 homes every issue, we have a direct contact with our customers, and we have a medium in which we can print what we like. Can anyone ask for more?

Kitchen Lighting Unit Campaign of Southern California Edison Co.

SELLING 15,000 kitchen lighting units in a sales campaign of less than six months over an area including 255 incorporated cities and towns is the record made by the sales organization of the Southern California Edison Company.

The units were sold on a fifteen-day free trial—no money unless you decide to keep it—basis. If at the end of the trial period the customer decided to buy the unit, he was expected to pay 95 cents with his next succeeding lighting bill and $1 per month thereafter until $7.95 had been paid. If the customer decided that he did not wish to keep the unit it was taken out immediately and the original fixture replaced.

The Southern California Edison Company operates in thirty-one districts under as many district managers. It was not deemed advisable to attempt to cover the whole territory simultaneously. Sales crews of six to eight men were organized and sent out into the districts where they were placed in charge of regular salemen permanently assigned to that district. When a crew of salesmen completed work in one district they were transferred immediately to another district and began work anew and this served to minimize training expense to the company.

Many problems presented themselves to be solved when the campaign was in the making. Attempting to profit by the experience of others in similiar campaigns, those in charge read every available piece of literature on the subject and carefully planned the attack so as to get the maximum results with the minimum expense. It was decided to send out circulars to arrive at the consumer's home about three or four days ahead of the salesman's call. Much careful thought went into the making up of this circular. A complete layout of newspaper advertising together with window displays had to be planned to cover the entire campaign. The details of sales conditions, which have been explained above, were decided upon only after much deliberation.

Practically all of the 255 cities and towns served by the company have wiring ordinances and license regulations, including a fee for inspection of fixtures. In most of the cities this inspection fee was waived, but some of the smaller places required it. To meet these conditions the company made use of the local contractors for the installation of the units. Where a city or town had more than one dealer the work was divided so as to give all of them an equal opportunity. Use of the local dealers in this way served to focus their attention on the possibilities of more and better lighting business, and this helped perpetuate the desired effect of the campaign.

The salesmen found they could increase their output by carefully working the smaller shops and stores, inasmuch as it was possible to sell as many as three or four units to one consumer of this type with less sales talk than was necessary to sell one household installation. In one case 100 units were sold in three business blocks to these small merchants. In working up this type of business it was found at times that the unit which was being sold was inadequate to light a store or shop because of the high ceilings. Taking advantage of likely prospects of this kind discovered by the unit salesmen, live dealers were able in many cases to substitute larger fixtures requiring higher wattage lamps. Since the campaign had as its object the building up of the connected load, sales of this kind were very welcome to the company and made additional business for the dealer.

As the campaign progressed it was found occasionally that it was impossible for dealers to make prompt installations. To meet this condition men were sent out in pairs, one man to sell the unit and the other man to install it. Each of these crews was supplied with a list of customers, listed in meter book order, together with a supply of 15 or 20 of the lighting units. In towns where the houses were close together a salesman worked a block and then turned his sales over to the installer, who immediately proceeded with the installations. In the rural districts with the houses scattered salesman and installer worked together, the salesman assisting in the installation to save time.

Frequently a housewife with whom the salesman came in contact would be agreeable to giving the new unit a trial, but would be unable to convert her husband to the new idea. With a salesman and an installer working together, selling and installing a unit at the time of their first call, the housewife had a brilliantly lighted kitchen to use as an argument in winning her husband's approval of the purchase. The psychology of teamwork entered into this pairing off plan, and it was found that two men working together developed a pride in making good clean sales and satisfactory installations. All difficulties which may have arisen between the salesman and installer were eliminated by this arrangement. Teams working on this basis averaged about 12 sales a day, and this method of operating proved to be the most satisfactory system worked out.

The Application of Electricity for Domestic and Industrial Production of Heat

By Arnold Pfau

President, American Resistor Company
Consulting Engineer, Hydraulic Department, Allis-Chalmers Manufacturing Company, Milwaukee, Wis.

CONSIDERABLE discussion recently has taken place relative to this important subject and the fact that many power companies have embarked on a lively campaign to sell electrical appliances for the purpose of increasing their load and for improving their load factor, may justify an analysis of the various factors involved in this problem, not so much one as coming from a specialist in this particular field but rather from a layman, so to speak, one who surveys the field from the point of view of the consumer.

Application of electricity for producing heat, whether domestic or industrial, is affected in principle by the following two factors: 1. Initial cost of investment. 2. Cost of operation.

Initial cost of investment may be subdivided into two groups. a. Cost of equipment proper; b. Cost of installing same.

Cost of Equipment Proper

The question of cost of equipment is of more vital importance as relating to domestic application rather than industrial application. Investments for domestic application directly affect the pocketbook of the individual, and it may be seen at once that many applications are at present still out of reach of a great number of prospective consumers for the simple reason that these applications are beyond their means. Much has been done, of course, to reduce the first initial expense by a so-called installment plan. However, any level-headed buyer at once will realize that when he is through paying the total price paid is the same or a trifle above the original cash price. In other words, the initial price of the equipment still represents a heavy investment.

Investments for industrial application are justified when the total returns derived therefrom cover the interest on the investment, the depreciation and operating costs. When these factors are correct the problem simply is reduced to one of a banking transaction, the banker's funds taking the place of the individual's pocketbook.

Cost of Installing Equpment.

The cost of installing domestic equipment also has an important bearing as affecting the prospective consumer because in most of these cases the consumer is not able to do the installing himself, but is dependent upon a contractor or upon the power company doing the installation work. The expenses thus involved reach an amount which is a goodly portion of the cost of the equipment proper and which, therefore, again constitutes a serious drain on the individual's pocketbook.

Industrial installation costs, of course, involve a much smaller relative expense because most of this work can be done by the purchaser's staff and therefore does not carry the overhead charges unavoidable with a contractor or a power company.

Cost of operation also may be subdivided into two groups: a. Cost of electric current; b. Cost of upkeep.

Cost of Electric Current

It is evident that the cost of electric current plays a prominent part in the problem of analyses of economy of electric operation versus application of fuels (wood, gas, oil, etc.). It would, however, be folly to base such a comparison solely upon costs without giving due credit to the many advantages offered by electric heat. In general, however, such a comparison resolves itself into an analysis of two principal factors, viz:

(1) Cost of fuel versus electric energy;

(2) Economy in production, i.e., saving in lavor, reduction of waste, or scrap products and quality of product proper, as also the questions of cleanliness, absence of smoke or gases which may affect the product subject to heat (air in rooms, flavor of dishes cooked, product manufactured industrially), and also flexibility in application both as to time and individuality of location, etc.

In domestic applications it is difficult to express all these values in abstract figures, for the reason that many of them represent tangible assets only, the values of which vary with the taste of the individual user. As relating to domestic application the problem reduces itself to a comparison of the monthly electric power bill as against a monthly gas or fuel bill, the electric bill being credited with a tangible amount valued by the individual consumer.

As relating to the industrial application the various items can be expressed more readily in abstract figures, and the item of individual sentiment disappears completely. Here the superiority of the product manufactured by one or the other method can be valued in actual figures as also can the saving in labor, in waste or scrap products. The tangible item of convenience appearing in domestic application can be recorded directly by the health statistics of the factory crew, the statistics of accidents, etc., all of which reduces itself to almost a purely mathematical statistical procedure.

Cost of Upkeep

The term upkeep is better fitted in the case of industrial application. For consideration in connection with domestic application it may better be termed

"cost of replacement". Here we find a principal difference between the application of fuels and of electricity. Fuel leaves byproducts as the result of combustion, and these require removal (in a greater or less degree) and affect the parts in contact with the fuels or products of combustion. Electricity leaves no byproducts and therefore speaks for itself as to cleanliness and absence of cost for removing byproducts. However, the carrier of the heat-producing electricity, the so-called "resistor", is subject to unavoidable and gradual destruction like a bulb of an incandescent lamp, and this introduces the problem of periodic replacement which involves the expense for replacing materials and for installing them, as well as interruption of service, which is not as vital in domestic operation as it is in industrial operation where it incurs loss of production. Therefore, it seems that next to the item of rates for electric current the question of upkeep becomes a paramount issue because on it depends to a large extent the feasibility of using electric-heated or fuel-heated appliances.

If upkeep cost can be reduced to such a degree that it constitutes a small addition only to the electric current bill, then the battle of pushing the use of electrically heated appliances is more than half won. Upkeep cost, as stated before, should not only include the cost of materials to be replaced but also, and even more so, the tangible expense incurred, namely, the inconvenience of exchanging the materials and the interruption of service.

A close scrutiny of the item of cost of replacement proper at once will reveal a fact which may furnish the key toward a material reduction of cost. It is the heat-producing part, the resistor proper, which requires replacing, whether in domestic or in industrial application, but unfortunately so far it has been impossible to replace only the resistor, exclusively, because its mounting in many electric appliances is inseparably combined with other materials (refractory supports, etc.) which either must be removed when the resistor is exchanged, or must be renewed entirely with the resistor. The item of upkeep therefore is composed of several factors, namely, cost of resistor proper; cost of refractory material or mounting; cost of labor for exchange and interruption in service. All of these constitute an amount which in many instances renders the use of electric appliances uneconomical.

In domestic applications such as room heaters, kitchen ranges, etc., the temperatures required are moderate so that the life of the resistor proper is relatively long; therefore its actual replacement cost would be tolerably low. However, in most of these instances the resistor alone cannot be replaced readily by the layman-consumer but must be purchased and replaced together with its mounting. It is right here that considerable amount of money must be spent for replacing materials which really are not at all burned out and therefore would require no replacement. Again, it is often the accessory material which shortens the life of the resistor proper and thus increases the expense of upkeep. The accessory material or refractory often is the direct or indirect cause of short circuits which destroy the resistor proper, such as is the case with kitchen ranges where the resistor proper is mounted openly in the refractory and where water or foods spilled over cause such destructive short circuits. This evident disadvantage has been eliminated partly by the use of heating elements in which the resistor is embedded entirely in the refractory and other materials so that direct contact of the resistor with the outside is avoided. It is needless to say that this cannot be done without adding a considerable item to the price of the heating element, and it also adds "dead or inactive material" which must be heated and which thus constitutes a considerable part of the electric current bill, at the same time delaying the process of quickly and economically producing heat and of transmitting it as directly as possible to the object to be heated and retaining a considerable amount of heat after none is required.

We all know that the laws of nature are immutably fixed. This, of course, applies also to the relation between electric energy and heat. One kilowatt-hour equals 3,412 B.t.u., not more and not less. No matter what a resistor is made of it cannot produce more B.t.u. per kw-hr. than the above law permits, and the efficiency of this transformation is 100 per cent. Nevertheless there is a wide range of difference between kilowatt-hours consumed for the purpose of heating an object and the actual heat transmitted to the object, just as there is, as we all know, a big difference between the price which the producer receives and the price the consumer pays, although the quality of the object (potatoes, etc.) may remain (more or less) the same.

This may be well defined by introducing the term "heat dissipation". Efficiency (e) can be defined as the relation between kw-hr. or B.t.u. input and heat output. Let B.t.u. be the heat input and $B.t.u._1$ the heat output, or the actual heat absorbed by the object to be heated, then

$$e = \frac{B.t.u._1}{B.t.u.} \times 100 \text{ in per cent.}$$

$B.t.u._1 = B.t.u. - (a + b)$ where

a = heat absorbed by the mounting of the resistor;

b = heat loss due to radiation into the space between the heating element and the object to be heated.

The value "a" is a quantity which is intimately interwoven with the type of the resistor, and it may be seen at once that with resistors requiring no refractory mounting or support the value "a" practically disappears.

The value "b" involves the question of design of the appliance, and the success of reducing it to a minimum depends upon the engineering skill of the designer of the appliance. This skill embraces the familiarity with proper insulating materials and the knowledge of the laws of radiation, circulation of air currents, etc.

If the items "a" and "b" can be reduced to a minimum then the efficiency and the commercal success of the electric appliance is assured, at least from the point of view of economy of current used.

A close examination of the factors determining the value "a" will furnish a key toward finding the most efficient heating element.

The heat absorbed by the mounting of the resistor not only affects the question of economy of total kilowatt-hours required but also affects the life of the resistor proper. It is evident that the inherent heat of the accessory (refractory) material partly surrounding or in contact with the resistor causes a temperature of the resistor proper which is, of necessity, higher than it would be if the heat radiated from the resistor were carried directly to the object heated. In other words, resistors surrounded by or embedded into accessory materials are subject to a higher temperature, and consequently their life must be correspondingly shorter. The gradual destruction of a resistor is evidenced by a gradual increase in resistance so that the kw-hr. absorbing capacity is reduced gradually and the heat produced therefrom becomes less and less. This takes place even on the assumption that the resistance of the resistor remains uniform over its entire conductive length and area. Quite frequently, because of lack of homogeneity of the material of the resistor due to the physical discrepancy in conductive areas, so-called hot spots develop, that is, spots of high resistance in the resistor, whereby locally high temperatures are produced which destroy the life of that particular portion of the resistor and finally render the entire resistor useless. Where resistors consist of a series of coils it is evident that any short circuit between two individual coils affects the resistance and also brings about the condition of hot spots described before. From this it is at once evident that a resistor consisting of a single conductor is freer from the danger of short circuits of the above character.

Other items worthy of discussion are, for instance, those of conductivity, radiating capacity and physical strength of the resistor material.

Conductivity

In order to carry a desired amount of electric current a certain area of conductor is required, and this in turn depends upon the specific electrical conductivity of the material of the resistor. A high specific electrical conductivity requires a smaller area than a low specific conductivity for a fixed amount of current to be carried.

Radiating Capacity

The amount of heat radiated from the resistor depends upon the temperature drop between the resistor and its surrounding space and also the radiating surface of the resistor, both as to physical size as well as condition of smoothness of surface.

Physical Strength

The strength of a resistor enters into the problem to quite an extent inasmuch as the resistor must be either self-supporting, i.e., it needs to be supported only at its two terminal ends, or if it is not self-supporting it requires special mounting or embedding in a refractory material, as previously explained.

A clear comparison of these three factors may be obtained by means of tentative mathematical formulae, based for simplicity's sake on a conductor of circular area such as is the case with wire resistors or bar-shaped resistors.

Conductivity

This may be illustrated by formulae. The well known relation $C^2 R = W$ (where C represents the ampere capacity, W the watt capacity and R the resistance in ohms per unit of length of the resistor) can be transformed by introducing the following relations:

$V C = W$ (where V equals the voltage of the electric energy flowing through the resistor)
and

$$(1) \qquad R = \frac{\phi^1}{\frac{\pi d^2}{4}} = \frac{\phi}{d^2}$$

where ϕ represents a coefficient embodying the electrical specific resistivity or resistance of the resistor material.

Thus we obtain

$$(2) \qquad \frac{C^2 \phi}{d^2} = W$$

or the electric energy W carried in the resistor is in direct linear proportion to the length and the electrical specific resistance and inversely proportional to the square of the diameter of the resistor.

Radiating Capacity

The surface of a circular section resistor of the diameter d and length l is $F = \pi d l$ and the heat radiated from this surface is

$$(3) \qquad H = \theta^1 F (t_1 - t_2) = \theta d l (t_1 - t_2)$$

where θ represents the coefficient characteristic of the radiation of the surface of the resistor material and $t_1 - t_2$ the difference in temperature between that of the resistor proper and that of its surrounding space or object.

From the above it may be seen that the heat H radiated is in direct and linear proportion to the radiating coefficient, the diameter, the length and the temperature drop.

Physical Strength

The physical strength can be analyzed best by the deflection of a conductor, supported freely on each end or terminal, and subjected to its own weight P. (See Fig. 1.)

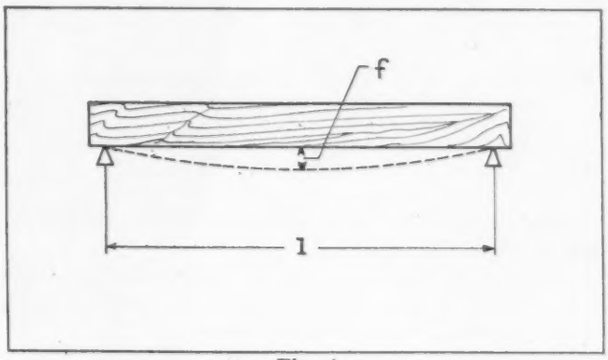


Fig. 1

The deflection f can be obtained from the well known formula

$$(4) \qquad f = \frac{3}{384} \quad \frac{P l^3}{E I}$$

where P equals the total weight of the resistor of length l, E, the modulus of elesticity of the resistor material and I the moment of inertia of bending of the resistor.

Assuming a circular area of the resistor and a uniform diameter d throughout its length l, also a homogeneous material, so that

$$(5) \qquad P = \Sigma' \frac{\pi d^2}{4} l = \Sigma d^2 l$$

where Σ represents the specific weight of the material and since

$$(5a) \qquad I = \frac{\pi d^4}{64}$$

for a circular area, we have

$$(6) \qquad f = \frac{3}{384} \quad \frac{\Sigma d^2 l^3 64 \pi}{E \pi d^4} \qquad \text{or}$$

$$(7) \qquad f = \frac{M \Sigma l^4}{E d^2}$$

The dimensional values l and d can be eliminated by using equations (2) and (3), since

$$d^2 = \frac{c^2 \phi}{W} \quad \text{and} \quad l = \frac{H}{d \theta (t_1 - t_2)}$$

or substituted in (7)

$$(7a) \qquad f = \frac{M \Sigma}{E \frac{c^2 \phi}{w}} \left[\frac{H}{\sqrt{\frac{c^2 \phi}{w}} \theta (t_1 - t_2)} \right]^4$$

or re-arranged

$$(7b) \qquad f = M \frac{\Sigma}{\phi^3 \theta^4} \frac{1}{E} \left(\frac{H}{t_1 - t_2} \right)^4 \frac{W^3}{c^6}$$

The value $\frac{H}{t_1 - t_2}$ represents the heat radiated per unit of temperature drop, or a certain amount of B.t.u. and is therefore proportional to the electrical energy, kw-hr. or W.

Thus $\left(\frac{H}{t_1 - t_2} \right)^4 = n W^4$

and since $\frac{W}{C} = V$ as used before, we have

$$(8) \qquad f = M^1 \frac{\Sigma}{\phi^3 \theta^4} \frac{1}{E} V^7 C$$

In this equation the dimensional values d and l are replaced by the values

Φ specific electrical resistance of resistor material
θ coefficient of surface radiation of resistor material
Σ specific weight of resistor material
E modulus of elasticity of resistor material
V voltage of current used.
C ampere capacity of current used
M^1 = an absolute constant.

Although this formula is of a purely hypothetical character it gives a good picture of the inter-relation of some factors affecting the physical strength of a resistor. It is evident that other similar equations can be derived by substituting for the length (l) or the diameter (d) values embodying for instance the coefficient of expansion of the material.

It may be seen at once that the specific weight (Σ) and the ampere capacity (C) affect the deflection directly and linearly. The modulus of elasticity (E) of the material affects the deflection linearly but inversely. The electrical specific resistance (Φ) and the radiating coefficient (θ) affect the deflection more materially, viz: inversely in the third and fourth power, respectively, and the voltage (V) of the current has a most prominent direct effect, viz: relatively in the seventh power.

Doubling the specific weight (Σ) of the material and doubling the amperes (C) each doubles the deflection. Reducing the modulus of elasticity (E) to one-half also doubles the deflection. Doubling the specific resistance (Φ) reduces the deflection eightfold. Doubling the radiating quality (θ) of the material shortens the resistor and thus reduces the deflection sixteen-fold, and doubling the voltage (V) increases the deflection one hundred and twenty-eight-fold.

From the above it may be seen at once that a heavy resistor material (large Σ) and one of low specific electrical resistance (Φ) increases the deflection tremendously, even to the extent that such a resistor becomes incapable of being self-supporting. The conclusions drawn from the above tentative mathematical formulae are corroborated by the fact that resistors of high-grade metals of low specific resistance, i.e., of high conductivity, must be made of wire coils in order to keep the required conductive area ($\frac{\pi d^2}{4}$) small, and in order to obtain enough length (l) to carry only the desired amount of electric energy. The coil, however, is not self-supporting, and so requires an accessory material for support.

It should seem in order, therefore, to look for a material which has a moderate specific conductivity $\frac{1}{\Phi}$ —so that a reasonably large area or diameter is required that at the same time increases the radiating surface and permits of a more simple form of resistor, both as to physical shape and as to mounting.

The modulus of elasticity (E) also plays an important role because it is a function of the temperature and with metals decreases as the temperature increases. Thus the defleection becomes greater, which, as previously pointed out, is an undesirable feature.

A resistor material with a modulus of elasticity which is not reduced seriously by high temperatures, i.e., which does not deflect materially when supported only at the two (terminal) ends of the resistor therefore shoud be looked for.

Since metals have a relatively high specific electrical conductivity and have a modulus of elasticity which decreases appreciably as the temperature goes

up, it follows that in order to reduce the effect of these undesirable factors a material should be looked for which is non-metallic and which, of course, is capable of resisting deterioration under as high temperatures as can be produced for practical purposes. Such a new non-metallic resistor recently has been introduced to the market. The resistor is a mixture of metallic and non-metallic ingredients, moulded into suitable forms and heat-treated. The product is a solid, hard mass of sufficient rigidity to permit of self-support between the two terminal ends, and is capable of producing temperatures as high as 2,800 deg. F. without uncommercial deterioration. The use of a mixture of ingredients permits of a practical variation of the value (Φ) and to some extent (E) so that the cross-sectional areas and lengths of such resistors can be varied within practical limits to suit available space for a given amount of electric energy to be carried. The same applies also to the degree of heat to be produced.

Since this kind of resistor is capable of self-support it eliminates two vital factors which were pointed out before as affecting the question of economy of first cost and of upkeep.

The first cost is reduced because the refractory mounting is eliminated, aside from the fact that the material proper is not as costly as a high-grade metal or alloy. The upkeep is reduced because only the resistor proper need be replaced. This permits of replacement at low cost and simplifies the actual work of replacement in that the resistor is not a delicate piece but one which may be handled readily by a layman and readily removed without requiring special skill.

These advantages will prove of tremendous value both in domestic as well as industrial application.

If the simple resistor proper of the electrically safe single-conductor type (not exposed to the danger of becoming short-circuited) can be exchanged in a kitchen range, for instance, as easily as a lamp bulb by the housewife without requiring skilled assistance, and if such a resistor piece proper may be obtained at moderate cost and readily kept on hand in reasonable quantities, the battle towards increasing the sale of such electric appliances and of thereby increasing the loads of the power companies is half won.

If a resistor can be used in industrial heating appliances that is so self-supporting that its terminal ends may be kept outside of the high temperature heat chamber, if its mounting is so simple that each individual resistor may be removed without requiring a complete shut-off of the furnace and a consequent total interruption in production, the tangible assets of advantages become abstract figures which credit the electric power bill to such an extent that the question of feasibility of using electricity at reasonable rates versus fuel once and forever is settled in favor of electricity.

If such a resistor is capable of commercially producing industrial heats which heretofore could not be produced except by the electric arc, which in many cases prohibits its application, the field of industrial application of electric heat can be widened tremendously.

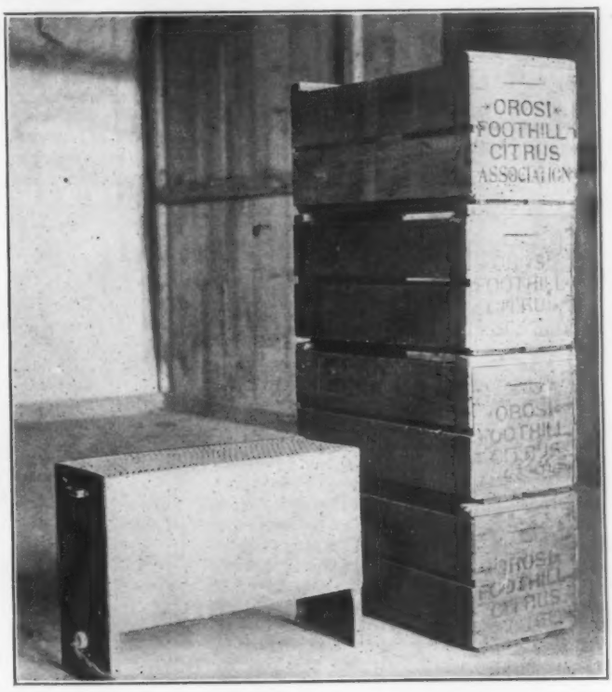
It would lead too far here to dwell on all the many other points involved in this important discussion, the intent of this article having been only to point out to power companies a new and promising field of activity opened up by the introduction of the non-metallic resistor.

Electricity Used in Process of Coloring Citrus Fruits

CITRUS fruits attain their sugar content and are picked long before they reach the desired golden color, which must be added by artificial means. The transformation of the partially colored oranges as picked from the trees to the pile of gold appearing on market stands now is being brought about electrically.

The electric method is to place the boxes of fruit in a tightly closed room, approximately 15 x 25 x 10 ft., and to produce a temperature of about 80 deg. F. by means of a non-glow heater, usually of 5-kw. capacity, either portable or installed in the wall. This constant temperature, together with the moisture of the fruit, causes the fruit to sweat. It is necessary to introduce certain gases into the room to produce the desired color, and after experimenting for some time, the United States Department of Agriculture has recommended the use of ethylene in quantities of one part gas to 10,000 parts air. Three applications of gas and two to four days in the sweat room complete the transformation, and so satisfactory are the results that citrus growers are adopting the electric method wherever power is available.

The method formerly used was to heat the sweat rooms by means of kerosene lamps which, when smothered, produced carbon monoxide, a gas which aided in the coloring process.



Portable 5-kw. heater used in sweat rooms to color citrus fruits. Ethylene gas is used with the electric heat

CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

Blizzards Fail Against Mountain Power Line

Construction and Maintenance Features of Construction Line Operating at an Elevation of 9,500 Ft.

By G. C. HECKMAN, Superintendent of Electrical Construction, Southern California Edison Company, Big Creek, Calif.

Several years ago, when the Florence Lake tunnel and dam were contemplated it was thought by some that there would be great difficulty in maintaining a transmission pole line into and over the mountain fastnesses of this project. However, the progress records made in the building of this tunnel put down any doubt there might have been concerning the reliability and continuity of service due to consideration of the rugged nature of the country involved. For the first two years of the construction period the line was a combination pole and tree line, that is to say, sections of the line were supported on poles and other sections of the line were built on trees. This was done in spite of the fact that it was known that a tree line is unreliable for a project such as this. The line was constructed in this manner principally, as thought by some at the time, to expedite matters and save expense. Troubles and outages were continuous with this type of construction.

Fig. 1—A section of the Florence Lake 30-kv. line showing original construction. Serious outages were chargeable to this type of construction

Since the line has been entirely of pole construction there has been little or no trouble. While there were several hundred hours outage during a year's period when the line was in part on trees, there has been but a few minutes outage during the past year and this only when there was momentary trouble on the entire system. This single-circuit line stood up under the blizzards which sweep across Kaiser Pass, at an altitude of 9,500 ft., when not even the huskies of the Alaskan dog team could make the grade.

Uninterrupted service over this line, the main artery of the tunnel work, was of paramount importance. Therefore it was essential that maintenance work be done in such a way as to eliminate interruptions in this work. However, this maintenance was not accomplished without severe hardship, well organized and well trained patrolmen and a practical radio communication system. There were times when as many as seven men acting as snowshoe trail breakers were necessary in order that one patrolman could reach a point of trouble with sufficient physical strength left to do the necessary work. Extreme emergencies such as this were eliminated after the line was constructed entirely on poles, the right-of-way cleared of overhanging trees and other precautions taken.

During the winter months and at times of severe weather, patrolmen were stationed at Cascada (Big Creek), Huntington Lake, Camp 60, Camp 61-C, Camp 61, Camp 62, and Camp 63. This covered all strategic points of the line (see map). Also there were radio stations at each of these locations. These men not only patrolled their assigned portions of the transmission line but also took care of the line work in and about their respective camps and were subject to call day or night.

All clearances for line work or switching were given and returned by radio telegraph. No electrical accidents, either on the line or in the camps, were experienced during the whole construc-

Fig. 2—G. C. Heckman bucking 5 ft. of snow while inspecting Florence Lake line during winter time

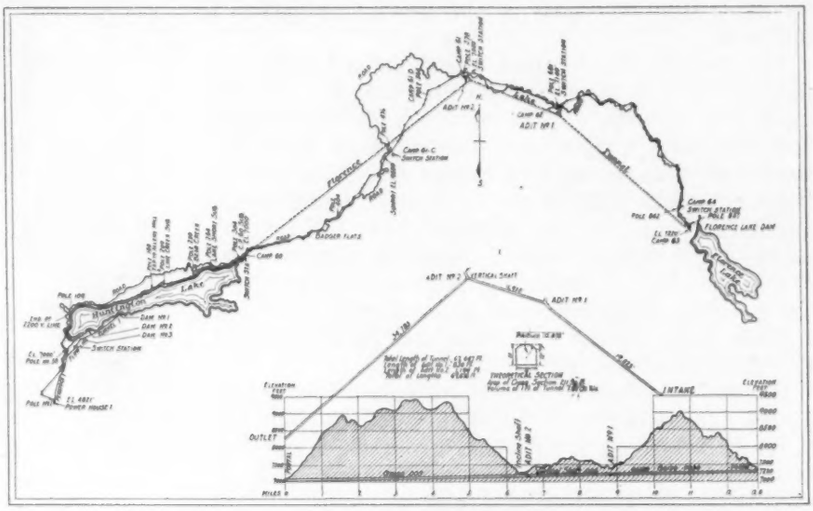


Fig. 3—Map showing the relative location of the tunnel, road, transmission line and the two lakes. Relative elevations may be checked by reference to the profile

tion period. A definite system for the operation of this line was drawn up and distributed to the proper parties in the form of a circular letter. The context of this letter was as follows:

Wait at least one minute before closing switch on Florence Lake line after an interruption. If switch opens violently, wait ten minutes and again try to energize.

Notify the Cascada telephone operator in case of any trouble.

Instructions to Upper Camps

In case power is off more than five minutes, open 30-kv. oil section switches, only, in line to next camp, leaving the local transformers connected unless there is trouble in camp. Stand by for test.

At the end of ten minutes, a test will be made on line as follows:

1. Power house operator will energize the line to Camp 60.
2. As soon as power is on, 60 will energize to 61.
3. Camp 61 will energize to 62 in the same way.
4. Camp 62 will close switch to 63.

Fig. 4—Typical section of 30-kv. line after reconstruction which removed it from the class of temporary construction lines to that of a genuine transmission line. A standard A-frame corner tower appears in the foreground. Note stock of replacement insulator units hung on pole to assist maintenance crew

That section on which trouble appears should be left out subsequently and the good portion of the line energized as above.

Establish radio communication as soon as possible and advise the operator if there is any trouble in camp.

Patrolmen should stand by in camp until tests have been made to locate the section of line trouble. Proper clearance must be obtained before going out on the line.

Disconnect switches at Huntington Lake and Camp 61-C are not to be opened except on instruction from Cascada.

Under no circumstances are telephones to be attached to the 30,000-volt line, except by special instructions and approval by Mr. Heckman, superintendent of electrical construction.

These instructions will be posted in all Florence Lake line switch and transformer houses, also in the electric shops and patrolmen's quarters.

Fig. 5—Typical tie-down construction used for vertical angles in line

This uniform scheme of operation helped to minimize outages.

Practically all of the holes for the pole line had to be shot, as the country is mostly of solid rock formation.

For the voltage and actual carrying capacity of the line, the construction was unusually heavy. As may be seen in the accompanying illustrations three standard insulator disks are used for both strain and suspension points. Numerous tie-downs are used and additional supporting insulators are used at all strain locations. These special features have contributed greatly toward the uninterrupted operation of the line.

The beginning of the line at Power House 1 was located at Cascada. The line was supplied by three banks of 6.6/30-kv. transformers connected to a bus in such a way that one or more banks could be used according to the demand. These transformers were fed from a 6.6-kv. bus which in turn was supplied through automatic oil switches from the 6.6-kv. generator buses. All buses were in duplicate.

The major portion of the load on the line naturally was compressor plants. The balance of the load was made up in saw mills, electric shops, machine shops, warehouses, carpenter shops, bakeries, mess halls, garages, ice plants, hospitals, pumping plants, motor-generator sets for electric tunnel locomotives, radio stations, offices and general illumination. All the distribution was metered at the respective load locations, and a complete and accurate accounting was kept of all power used, thereby making it possible to distribute to each account the proper proportion of power consumption.

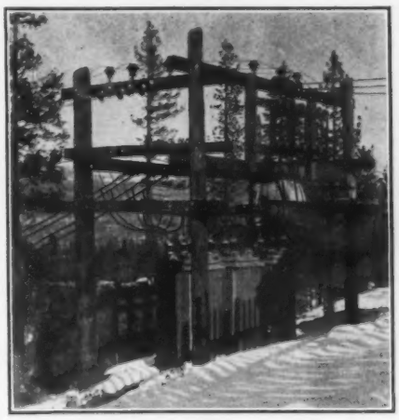


Fig. 6—Typical substation on Florence Lake 30-kv. line, serving construction camp No. 61 at El. 7,050

Two different pole-line methods were used in the construction. Two sections were built with three-pole construction at angle points, and the balance of the line was built with A-frames at the angle points. It is thought that the A-frame construction is desirable because of stability, fewer holes to dig for anchors, and a lesser number of places such as guy lines and bridles on and around the structure for a snow load to accumulate. The different types of line construction are shown in the accompanying illustrations.

Sectionalizing oil and disconnect switches were provided at each camp to facilitate the definite location of the part of the line in trouble. As soon as the faulty section was located this section was isolated and the balance of the line towards the source was energized. This method kept the maximum amount of line in service while the trouble was being cleared.

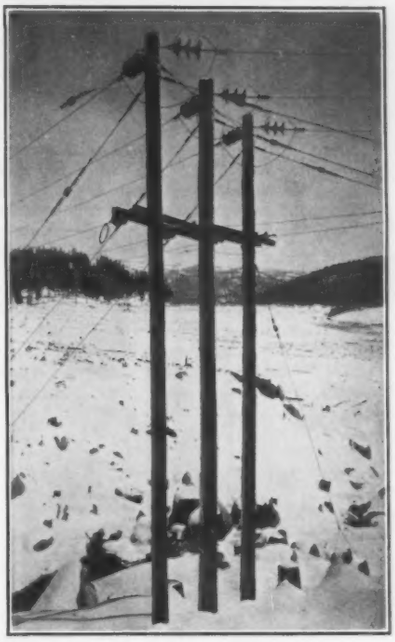


Fig. 7—Typical 3-pole angle tower used at certain locations on Florence Lake 30-kv. line. Note spare insulator units located on pole to assist maintenance crews. Pole No. 104 at El. 7,000

Latest Thing in Shorts.—A 3-ft. king snake some time ago caused an interruption to service over the main transmission line of the Southern Sierras Power Company in the Imperial Valley when it crawled to the top of a transformer, 15 ft. from the ground, near El Centro, Calif., and short-circuited the 17-kv. terminals. Knocked to the ground by the force of the short, the snake started out in quest of further excitement but was killed at the door of the power house by the operator.

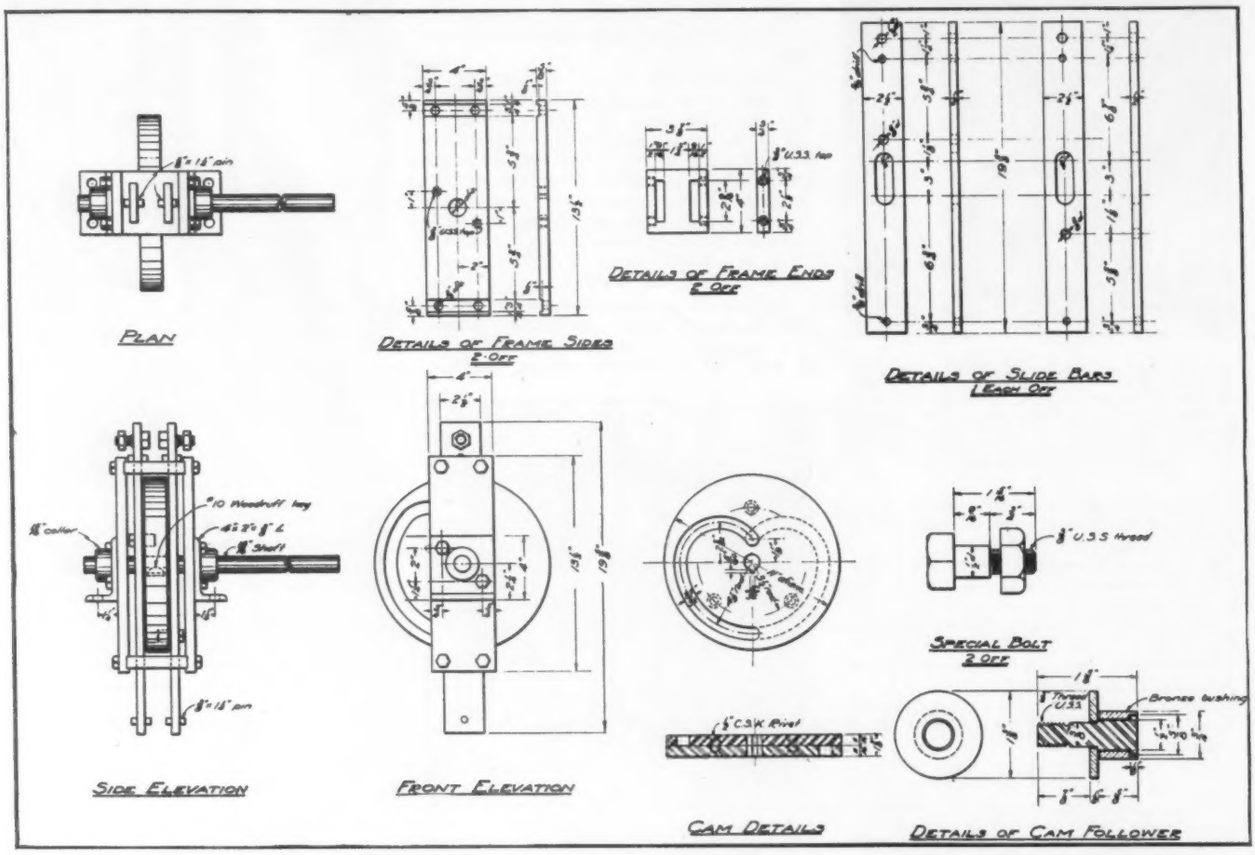
Fig. 8—Winter maintenance work on the Florence Lake 30-kv. line is assisted materially by "Jerry" and his famous Alaskan dog team. Details are described in the article by G. C. Heckman on preceding pages

Single Mechanism Operates and Interlocks Two Switches

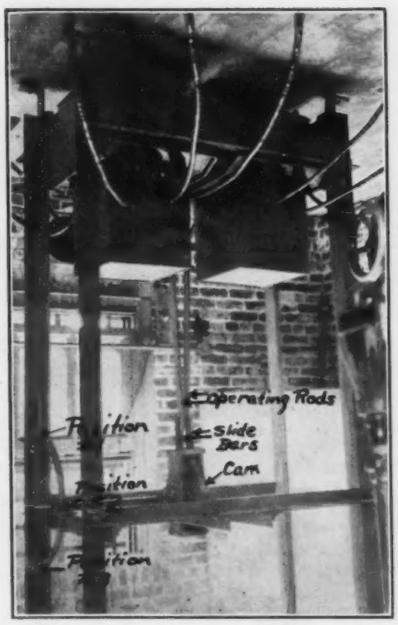
For locations where it is necessary to effect a quick change-over of a circuit from one source to another the San Diego Consolidated Gas & Electric Company has developed the mechanism shown in the accompanying illustrations. This arrangement is particularly serviceable where conditions do not permit or do not warrant an automatically controlled double-service supply for feeder lines. It is further adaptable to installations where it is impossible to tie directly together on a common bus the two or more supply lines which would constitute the duplicate supply. Unsatisfactory voltage conditions might make it undesirable to effect such a tie. The possible applications of the equipment are many.

The apparatus itself is simple and easily made, as reference to the illustrations will show. The piece of most interesting design is perhaps the cam. This cam is so designed that rotation through an angle of 180 deg. will supply the motion necessary to open one oil switch and to close another. It may be seen that the cam is double-faced and has a runway for a roller on each face, one for one switch and one for the other. These rollers are mounted on the ends of slide rods which are supported in the frame which mounts the cam itself. From the slide rods operating rods extend up to the operating

Close-up view of one side of the operating cam. This is the heart of the switch-operating device described in the accompanying article



Design details of mechanical operating and interlocking apparatus developed by the San Diego Consolidated Gas & Electric Company



Installation of two oil switches and single-cam operating device which also interlocks the two switches

handles of the switches. The two switches are mounted so as to throw the two operating handles together, thus necessitating only one cam for the operation of both. This results in more positive and safe sequence of operation of the switches.

An operating handle is carried to the side of the frame that carries the switches. There a segment over which the handle slides is provided. This segment is arranged so that the handle may be locked in either extreme position or in mid-position. When the handle is in one extreme position one switch is closed and the other open. With the handle in the opposite extreme position this condition is reversed. Both switches are open when the handle is in mid-position; thus it is apparent that one switch cannot be closed before the other is open.

Electrical Mucking Machine Used in Shaver Lake Tunnel

Aiming to expedite the removal of the muck in the construction of the tunnel between Huntington and Shaver Lakes, the Southern California Edison Company has decided to use, in the various headings, the Conweigh direct drive electrical mucking machine equipped with a 50-hp. motor.

This tunnel has a cross-section equivalent to a circle with a diameter of 13½ ft., and it is impractical to use the large air-operated steam shovels such as were used on the 13-mile Florence Lake tunnel with its 15-ft. cross-section.

The bucket of the machine is extended from one end of a four-wheel truck on a rigid arm which may be swung from side to side or up and down. In the truck are contained the motor and machinery for operating machine, together with apparatus for handling an endless belt conveyor, which extends out over the rear end of the truck in such a manner as to permit of running a muck car under it to receive the muck. The bucket or scoop is forced into the muck pile, while in a horizontal position, by the moving forward of the entire car. When it has buried itself in the muck the scoop arm is elevated and the scoop pours its contents back onto the conveyor belt which carries it out to the muck car in the rear.

In driving the pioneer 8 x 8-ft. drift for the Moffat tunnel this same machine, cut to the smallest workable dimensions, is being used and proving to be extremely economical and rapid.

Electric Furnace in Hawaiian Sugar Refinery

From the Pacific Islands comes an interesting account of a novel application of the electric furnace. This furnace is being used by the McBryde Sugar Company of Hawaii for annealing sugar-mill roller shafts. Experience has shown that the life of these shafts can be lengthened materially if they are annealed periodically. This treatment seems to relieve the strains and crystalization caused by sugar rolling.

The electric furnace itself is about 3 x 3 x 20 ft. in dimensions and is heated on the sides and bottom by Westinghouse type S furnace elements. Special alloy V-blocks are used in the furnace to support the shafts during treatment. Automatic temperature control is provided by a Leeds and Northrup pyrometer which operates through suitable relays and contactors.

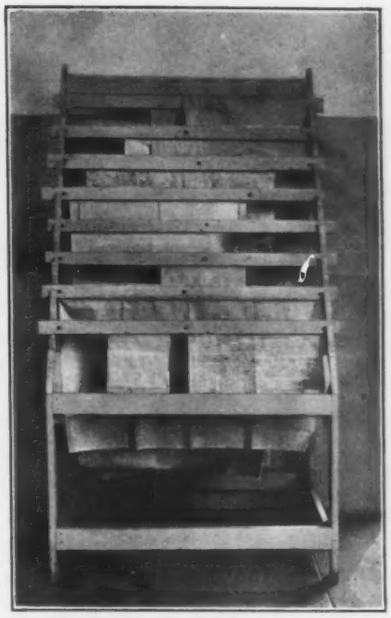
A nickel-steel roller shaft about 15 ft. long and 18 in. in diameter, containing about 0.3 per cent carbon and 3 per per cent nickel, was treated recently in this furnace. The shaft had been in service for some four years and was about to be transferred to a new sugar roller. Hence it was decided to give it the heat treatment. Nine hours were required for the shaft to reach a temperature of 1,200 deg. F. The temperature was held at this point for an hour and then allowed to drop slowly, dropping to 700 deg. in four hours. The total cooling time was 52 hours.

Lake Fordyce Dam Being Raised; Slide Kills Three

Lake Fordyce dam, a rock-fill structure in northern California owned by the Pacific Gas and Electric Company, is being raised 47 ft. in height. The original structure was built some fifty years ago. Prior to the work now under way it had a maximum height of 90 ft. and a crest length of 800 ft.

The addition to the height consists of a derrick-placed rock wall along the upstream face of the old structure, backed by a loose rock fill. The new rock wall is 25 ft. wide at the bottom (on the crest of the old structure), and 10 ft. wide at the top. The upstream slope is ¼ to 1, and the donwstream face is almost vertical. The plan contemplates laying this rock wall up carefully as a facing for the loose rock fill to be placed behind it. The upstream face of the rock wall is to be faced with concrete.

A break, in which about 1,000 cu.yd. of the downstream face of the rock wall slid down, killed three workmen and injured three others on Aug. 28. At the time of the accident several hundred feet of derrick-placed rock had been finished to full height at the north end of the dam.



Blueprints and wiring diagrams around a station are generally a source of annoyance because they are hard to keep clean and easily misplaced. The operators at the Newark substation of the Pacific Gas and Electric Company overcame this difficulty with the handy little rack shown in the accompanying illustration. This particular rack is made up of scraps of lumber, but is put together neatly and is painted to harmonize with the color scheme of the station. Common lath forms the binding strips which hold the blueprints in pre-selected groups

Wynooche Development Cost Estimated.—Carl F. Uhden, former chief engineer in charge of the construction of the Skagit River plant for the Seattle municipal lighting department, has completed a survey of the Wynooche power development, planned by the city of Aberdeen, Wash. (Journal of Electricity, May 15, 1925, p. 375.) In a twenty-nine page report to the city council Mr. Uhden states that 15,000 hp. can be developed at a cost of $2,639,000. He states that the gross revenue from the first step in construction would, at the prevailing rates in a number of Pacific Coast Cities, be more than double the revenue necessary to take care of the annual obligations. As a result of his report, the city of Aberdeen will submit a $2,639,000 bond issue to the voters this summer.

Permits for California Power Projects Issued.—Three permits covering the application of water from the North Fork of the Mokelumne River in central California have been issued to J. W. Preston, Jr., by the California Division of Water Rights. The project involves the construction of a reservoir of 60,000-acre-ft. capacity at Salt Springs. Two power houses are proposed, the upper one near the junction of Tiger Creek and the North Fork of the Mokelumne River, where 350 sec.-ft. of water will be used to generate 49,597 theoretical horsepower. The lower plant will be the existing Electra power house of the Pacific Gas and Electric Company where 225 sec.-ft. will be used to generate 37,483 theoretical horsepower. It is understood that Mr. Preston has a contract with the Pacific Gas and Electric Company for the output of the upper plant also.

IDEAS FOR THE CONTRACTOR

Second California Red Seal Home Built for Owner

Exeter Electric Company Makes Wiring Installation Which is Inspected by California Electrical Bureau

The second electric home in California to come under the inspection of the California Electrical Bureau under the Red Seal Plan recently was completed for R. R. Sherman, 224 North Dolores Street, Exeter, by the Exeter Electric Company of that town. Most of the electrical construction had been completed in this home prior to the time that the Red Seal specifications were announced. Although the home exceeded the requirements of the specifications in many respects, it was lacking in a few, so in order to make it a Red Seal home the necessary changes were made.

This company expects to build up many of its installations by calling attention to the standard established by the Red Seal specifications.

Pending the receipt of official Red Seals from the East, a letter was given to Mr. Sherman by George Rankin, field man for the California Electrical Bureau, stating that the home had been inspected and found to comply fully with the specifications laid down by the Society for Electrical Development and that certificates of proof would be given to Mr. Sherman as soon as they could be obtained.

Table 1 shows the various outlets installed and the number and kind specified for a Red Seal home. Contractors all over the state rapidly are grasping the sales possibilities in wiring homes which will meet the Red Seal standard specifications.

The minimum requirements for a Red Seal installation were given in the Aug. 1 issue of the Journal of Electricity (p. 95).

TABLE 1

Room	Light Outlets Installed	Switch Outlets Installed	Convenience Outlets Installed
Front porch	1	1	
Sleeping porch	1	2[1]	1[2]
Service porch	2	1	2[3]
Living room	1[4]	2[1]	4[5]
Dining room	1	3[6]	2
Kitchen	1	3[6]	1
Hall	1	1	
Bedroom	1	1	2[3]
Bedroom	1	1	1
Bath	1	1	1
Basement	1	1	1[2]
Garage	1	2[1]	1

Service—1¼-in. conduit with three No. 4 wires. Meter space 30-in. x 36-in.

Range circuit—1¼-in. conduit with three No. 6 wires.

Heater circuit in dining room—Two No. 10 wires in ¾-in. conduit.

[1] Two 3-way switches installed; 1—single-pole only in Red Seal specifications.

[2] None in Red Seal specifications.

[3] One in specifications.

[4] The contractor is trying to persuade the owner to install two brackets above mantel.

[5] Two in specifications.

[6] Two 3-way and one 4-way switches installed; 1—single-pole only in Red Seal specification.

Electragist Reorganizes Obsolete Electrical System in Mill

The accompanying pictures of the meter board and main center of distribution at the mill of the Contractors and Builders Supply Company, Fifth and Kirkham Streets, Oakland, show how effectively the Pacific Electric Motor Company of that city is able to reorganize an electrical system which has become obsolete and unsafe.

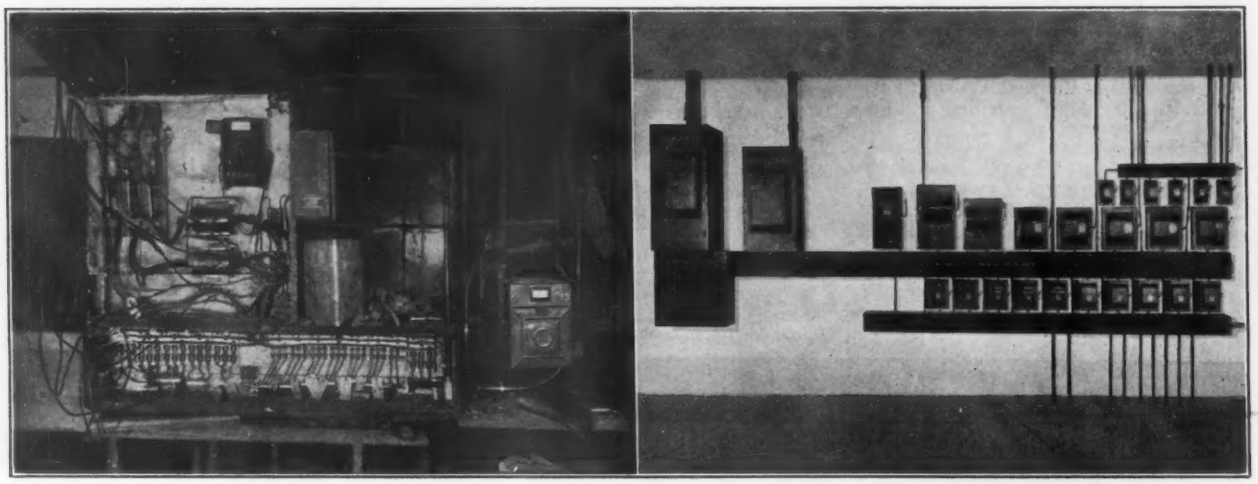
The old board was mounted on wood with asbestos backing, and a trained eye can pick out a number of things at first glance that are wrong; for instance, beside the fuses boxes and open knife switches a gas meter will be noticed. Like many such meters, this one leaked steadily. Moving it to another part of the plant when the board was reorganized was one of the improvements which materially lowered the insurance rate.

The complete change of installation shown by the picture was made without a shut-down of the plant. The new board was put right in the place of the old one with every detail complete.

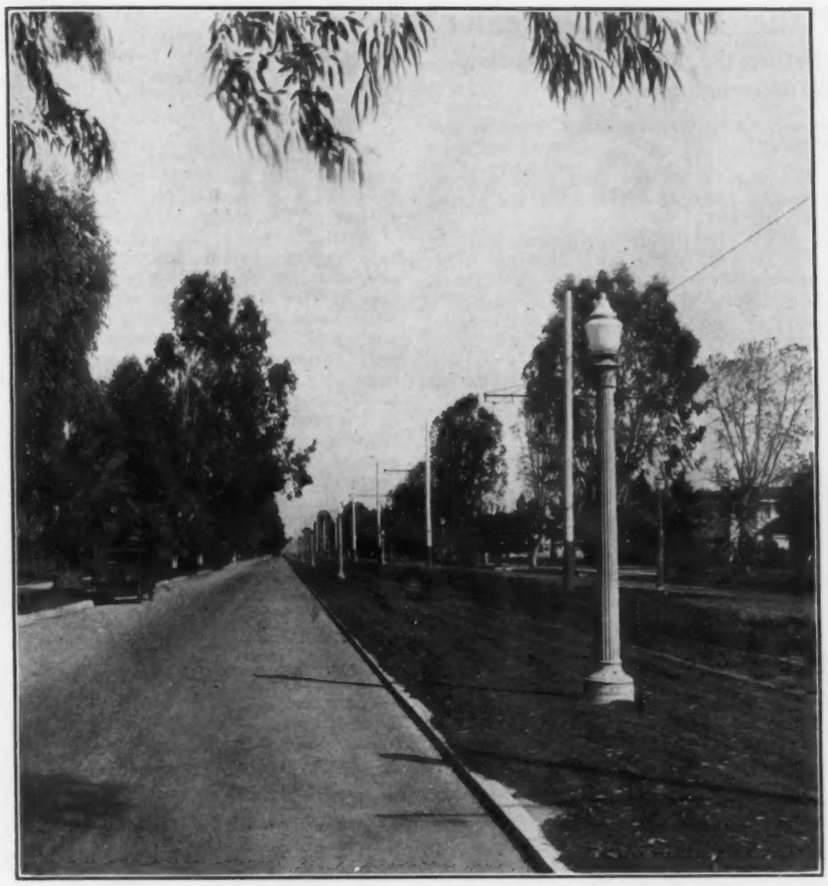
By the new system of control, any one of the circuits of the twenty motors can be shut off without disturbing the rest of the plant. Trumbull Type "A" switches were used with the necessary wire ways, etc. All the wires are hidden in the new system, and any flash or other trouble also will be enclosed entirely by metal.

The owners of the plant are said to have been so well pleased with the installation and so impressed by the clearness with which the pictures show the improvements that they sent a set of the pictures East to the stockholders.

Outside of its technical features, this job is interesting as an indication of what the Oakland field offers in the way of opportunities.



Left: Picture taken of the meter board and main center of distribution at the mill of the Contractors and Builders Supply Company, Oakland, prior to its reorganization by the Pacific Electric Motor Company. Right: The new board which replaced that shown on the left



Ornamental street lighting on Huntington Avenue, Fresno

Street Lighting Enhances Residential Districts

Fresno Extends Its Ornamental Electrolier System Under Supervision of Department of Public Works

By H. W. STITT, City Electrician, Fresno, Calif.

The extension of electrolier systems to the residential districts of Fresno, Calif., is resulting in its becoming one of the well lighted cities of the Pacfic Coast.

There are twenty miles of commercial and residential streets illuminated by single-light standards ranging from 250 to 600 cp. The plans outlined for 1925 will add from three to five miles, and it is expected that the future extension of the electrolier systems eventually will replace the old type of arc and incandescent lamps suspended in the center of street intersections in practically all the better class residential streets.

With the suspended type of street illumination there it has been found difficult to light the sidewalks and even the center of the streets where shade trees are planted along the curb line.

With the modern electrolier system the lights are at an elevation of 12 to 14 ft. to light center.

Good street lighting is a real safety measure. It assists in relieving traffic congestion by providing a well lighted highway where motor vehicles may travel in safety. Good street lighting frightens crooks and criminals working at night; the crook fears light as he would an officer. Night crimes are reduced 40 to 50 per cent as a result of well lighted streets.

The present practice in the installation of ornamental street lighting is to assess the cost against the property. This is regarded as an investment which improves property values and affords additional protection.

A well lighted city is a more pleasant residential place, civic pride is increased and the tourist or visitor seeing the lights is impressed at once with the progressive spirit of the city.

In the city of Fresno the details of construction of ornamental street-lighting systems are worked out in the Department of Public Works and maintained by the same department. Each street and lighting district is studied carefully to determine what illumination is required, and lamps are installed accordingly. In the event a brighter illumination is desired it is only necessary to change the lamps to the required size.

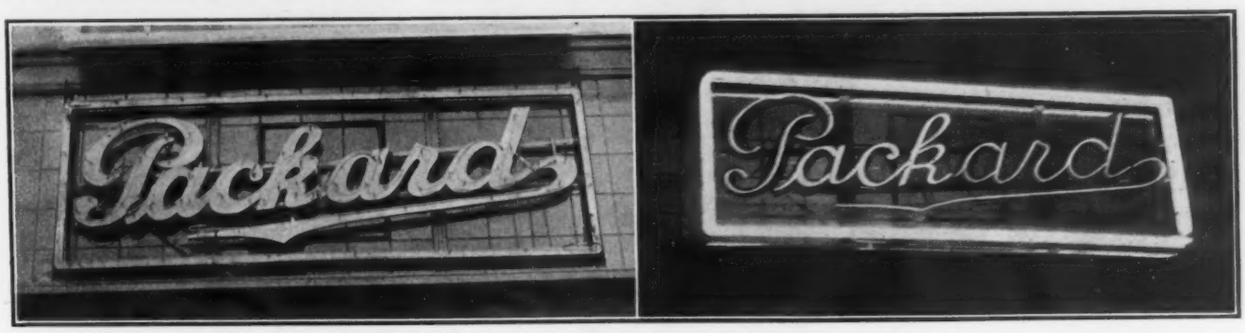
New 10,000-Volt Sign Installed for San Francisco Firm

An innovation in sign installations was made in San Francisco recently when a sign which operates at approximately 10,000 volts, was installed for Earle C. Anthony, Inc., at 1335 Van Ness Avenue.

The sign spells the word "Packard" in script lettering. The luminous part of it consists of several gas-filled tubes which follow the lettering and are placed about 4 in. from the face of the sign. The word "Packard" is divided into four circuits, each circuit consisting of one of these elongated tubes. They are as follows: (1) P, (2) ack, (3) ard, and (4) the tail of the d. The border of the sign consists of a similar elongated tube encircling the entire sign, which is approximately 4 ft. high by 12 ft. long.

The current is supplied from two transformers having 110-volt primaries. The transformers are located inside of the building above the door and are enclosed in a metal cabinet.

All of the circuit wires consist of primary cable enclosed in glass conduit. The main body of the sign has a pink-tinged light while the border is violet. The particular feature of the sign, aside from the beautiful coloring, is the fact that the light produced is practically free from glare. The sign and the tubes were made in France especially for Mr. Anthony and were installed by the Pacific Electric Construction Company. A similar installation has been made at the Earle C. Anthony, Inc., branch at Seventh and Olive Streets, Los Angeles.



Left: The 10,000-volt sign installed for Earle C. Anthony, Inc., in San Francisco. The gas-filled tubes which make up the various sections of the sign may be seen in this picture. Right: A night view of the sign

What Is the Future of the Electrical Dealer?

Extract from Paper Presented Before the Annual Convention of the California Electragists

By H. H. COURTRIGHT, President and Manager, Valley Electrical Supply Company, Fresno, Calif.

Properly to cover this subject—The Electrical Dealer's Future—it is necessary to go back some ten years to the time when the power companies were pioneering in the electrical appliance business.

If some of you will remember back that far, you will recall the big electrical appliance campaigns that were put on at that time. This, you will remember, kept up until about eight years ago, and at that time the power companies of California adopted a new policy. The power companies felt that the pioneering stage of electrical appliance merchandising was over, and it was the policy of most companies to step out of the merchandising business and turn it over to the electrical contractor-dealers, the hardware stores and the department stores.

With this change of appliance merchandising, hundreds of electrical specialty stores sprung up over our state. The contractor-dealer remodeled his store, and the hardware and department stores allotted more space to their electrical appliance department.

The electrical specialty store with its house-to-house salesmen set a pace on electrical appliance merchandising. The contractor-dealer tried to follow that pace, much to his sorrow. Some of you have asked yourselves the question: Why did not the contractor-dealer make a success of the electrical appliance merchandising? My answer to that question is this:

First, the term "contractor-dealer" is a misnomer. If you will analyze these words, "contractor" and "dealer", you will realize that the two words represent different types of men. A man might be a good electrical contractor but if he is, then he will not make a good merchandiser, and vice versa. If a man has merchandising ideas, he will not be gifted also with good contracting ideas. In other words, to make a big success of either it must be in the making of the dealer or merchant or the electrical contractor.

Another point is this: 85 per cent of the contractor-dealers are receiving 75 per cent of their gross receipts from the contracting end of their business, which means that 75 per cent of their time is devoted to that end of the business, leaving only 25 per cent—or less—of the time to be devoted to the merchandising end of the enterprise.

With this in mind, how could the contractor-dealer keep pace with the electrical specialty shop who was putting in 100 per cent of his time to electrical merchandising?

It Just Could Not Be Done

After trying electrical merchandising for a few years, there were a few electrical contractor-dealers who proved to be real merchants. These dealers changed their policy to a straight appliance business. The big majority of the contractor-dealers realized that they were not merchandisers and went back to their old line, that is, you might say, straight electrical contracting with a little retail store doing a small appliance business which helped to pay the rent on a store that gave a good-looking place of business for the wiring department.

With the power companies building new power plants and doubling their kilowatt-hour output every few years, they found that their electrical appliance or domestic load was not keeping pace with the balance of their load-building, and for that reason, you have heard of dozens of power companies again actively entering the merchandising of electrical appliances.

At this point I might state that my past two years' experience of doing a merchandising business in the lobby of a power company's building has convinced me that the power company's consumers seem to prefer purchasing their electrical appliances from the power company from which they are purchasing their electric energy. To substantiate this statement, the Valley Electrical Supply Company has two stores in Fresno—one in the lobby of the power company building and the other two blocks from that location. Dozens of people have come to its store in the power company lobby and purchased appliances, making the statement that they had seen the appliance on display at the Valley Electrical Supply Company, that is, at the other store, but that they wanted to purchase this appliance from the power company because they knew that the power company was anxious to see that the appliance gave service.

Further to substantiate this statement it might be well to quote a few paragraphs from B. C. Forbes' address before the N.E.L.A. convention held in June in San Francisco. His statement follows:

"Within the last two months I have done something along that line to boost the sale of electric ice boxes for I got orders from headquarters about two months ago that I had to buy 'her' a new electric ice box. There has not been to my knowledge one woman who has come to our house since then who has not been taken into the kitchen and shown the new refrigerating apparatus, and there has not been one who has not indicated there was going to be trouble for her husband when she got home.

"Then we customer-owners can help you—or can at least try to help you—with suggestions. I would like to offer one. I had a feeling I would like to buy my refrigerator direct from the public utility company. I felt that the company would be interested in seeing that it was kept in working order.

"I believe you will have to establish and run, shall I say, electrical department stores for us. We want to do business direct with you and not through third parties.

"Whether we like it or not, all of the present day economic trend is toward big business. The public would certainly rather deal with one party than have to go here and there to deal with people not interested in keeping an electrical apparatus going, and in supplying the juice to keep it going."

It might be mentioned at this time that in this two years of merchandising in the power company's lobby the Valley Electrical Supply Company never has had a customer come into its store and make the statement that he or she wished the power company to do his or her wiring.

With the power companies actively entering this electrical merchandising business, the question is: "What is the future of the electrical dealer?"

With the power companies stepping into appliance merchandising as they are, in other words, with one branch of the electrical industry stepping out with such strides and working under such policies as they have, it can spell only two words, that is, bigger business. By that is meant bigger business to all those who are engaged actively in the electrical business. These appliance campaigns will create more business for the contractor and electrical dealer, for with everyone in the industry tying in 100 per cent with the power companies in all their campaigns and helping them in every way possible, nothing but success can result. By doing this the contractor-dealers are keeping the electrical business within the four branches, namely: the power company, the electrical manufacturer, electrical jobber and electrical contractor-dealer.

Past history has proved that wherever a power company has put on a merchandising campaign it has stimulated the merchandising business of all the dealers and also has increased their wiring business. When you analyze the campaigns being staged by the Pacific Gas and Electric Company and the Great Western Power Company to sell 6,000 electric ranges between Aug. 1 and Dec. 31, do you realize that these campaigns alone mean $240,000 in electrical wiring?

In helping the power company put over these contemplated big load-building campaigns it is necessary that the electrical dealers or contractor-dealers adjust their stores and themselves so as better to fit them to take on this bigger obligation that is coming each year. So it would be well to dwell for a few moments on these two points: store display and advertising and illumination.

Store Display and Advertising

The subject of store display and advertising is too large even to attempt in this article. It should be mentioned, however, that you may understand its importance and because there are reasons for an attractive, clean, artistic and neatly arranged store. There should be unity in advertising and display. Windows and advertising should tie in very closely with each other and tell only one story at a time but tell that story well.

A contractor-dealer should spend part of his evenings studying color in the merchants' windows. Every merchant whose store in any way appeals to women has color in his window. It will pay you as electrical merchants or contractors to study these windows and their colorings and assimilate the idea that these merchants are using. Also when looking over these windows notice how many cards with something descriptive about the goods are in the windows. Appealing to women buyers as we are, we also should have cards in our windows that should be lettered neatly telling the story of the usefulness of the various appliances. These

cards describe especially the service of the article and should be brief, containing as a general rule one direct statement because it is only by means of this that the service idea can be put over to the public. These cards should be made by a card designer. Unless they are artistic they will give a cheap effect. Not to have a card in your window descriptive of the article or telling how economically it can be operated is like running an advertisement in a newspaper that consists of a picture and not a single word.

Illumination

Illumination is absolutely essential to contractor-dealer windows. People at night are in a receptive mood. They are out to see and are not worried about business. Every night of the year hundreds of women go window shopping. They are merely strolling from store to store to see what they can see. Women walking to and from theaters and cafes always look at windows. Every window in the retail district should be lighted until ten o'clock or even later. For a merchant to neglect his appeal to the night crowd is unpardonable. During the day electric lights can be used to kill reflections. How many windows have you passed that were only a blur? Have they any value?

An electrical dealer's window should not only be illuminated—it should be the best illuminated window in the city. It should be an example that will give ideas to other merchants who are out looking over windows as well as to the general public. You are selling illumination. If you cannot light your own window properly, who wants your advice on lighting other windows?

Seasonal Tie-in

Whatever appliance you are showing should tie in with the season of the year or with your local power company's appliance campaign. During the month of June, for instance, did any of your windows tie in with the idea of the June Bride? It might be mentioned at this point that the June appliance sales of the Valley Electrical Supply Company were 10 per cent greater in gross than its Christmas month sales. Sales in lamp socket or convenience outlet appliances for the month of June over the counter were more than $20,000. This does not include ranges, water heaters or heavy-duty appliances. Its merchandising appliance program of sales over the counter on lamp socket or convenience-outlet appliances is $1.25 per consumer per month, or $15 per consumer per year. Experience has shown that a special campaign of some home appliances once a month proves very satisfactory, this sale not consuming more than two weeks' time and being put on at a time when most of the employees of your city who are paid monthly receive their pay. This sale seems to put the dealer in the same class as the department store. After putting on a few of these sales, you will find the housewife watching for your advertisements and special window displays and also looking over your showroom display.

Service

Electrical dealers or contractor-dealers are selling a service rather than an article. It is not a washing machine that he is selling but the service that the machine will render; it is not the wiring job but the service that the wire will perform in the home, office or factory. In connection with this subject of service, the emblem of the Association, "The Electragist," should be used by every member of the Association. This emblem is symbolic of service which everyone knows is essential to success.

In closing, a few words should be said in reference to yourselves as contractors or contractor - dealers. Every electrical contractor or dealer in every city should be interested and take an active part in all organizations and movements that have for their purpose the growth and development of their city. This work has a very definite effect on his business. First, the larger his city becomes, the more business there will be for him to do. As he moves and works among his fellow men, the better known he becomes. The more intimate his activities become connected with those tending to make the city grow and become prosperous, the more often his name appears in the newspapers and more people come to know of him by reputation. This advertising is of the highest value, for the public thinks of its prominent men as reliable and worthy of confidence.

A study of the leading merchants of your city will convince you of the fact, and what is good business for them is good business for you. Many contractors and dealers have realized that important fact. More should. It will pay you to help your city become bigger and better and to associate yourself with its leaders. The electrical industry must be a unit in telling the electrical story. The electrical business is growing so rapidly from year to year that it is requiring more cooperation between the different branches of the business than ever before so contractor-dealers should get behind these big merchandising campaigns in a way that they never have before and make them a bigger and greater success than is expected.

The future of the electrical dealer is in his own hands. If he, the electrical dealer or contractor, only will take advantage of the opportunities before him, he will grow and prosper with the other branches of this great electrical industry.

Safety-First Installation for the Electrical Contractor

The Sept. 1 issue of the Journal of Electricty (p. 179) contained a discussion of a typical installation of a number of motors with various capacities, both large and small but all within sight of the operator. This was the fourth of a series of five which will show five different types of installations commonly made by the electrical contractor. The present discussion is the concluding installment in this series.

Fig. 5 shows a motor installed out of sight of the incoming fusible switch but with the starting equipment in sight of the motor. It will be noticed that the service enters a basement or pit and comes directly to the fusible disconnecting switch just ahead of the meter box, thence to the starting equipment located on the same floor as the motor equipment and in plain sight of the operator. In an installation of this type it is not necessary to have a non-fusible disconnecting switch in order to work on the motor.

Another point shown in Fig. 5 is the flexible conduit used for connecting from the conduit service to the motor, enabling the operator to slack off or take up on a belt drive.

The five installations discussed in this series cover the average job very well.

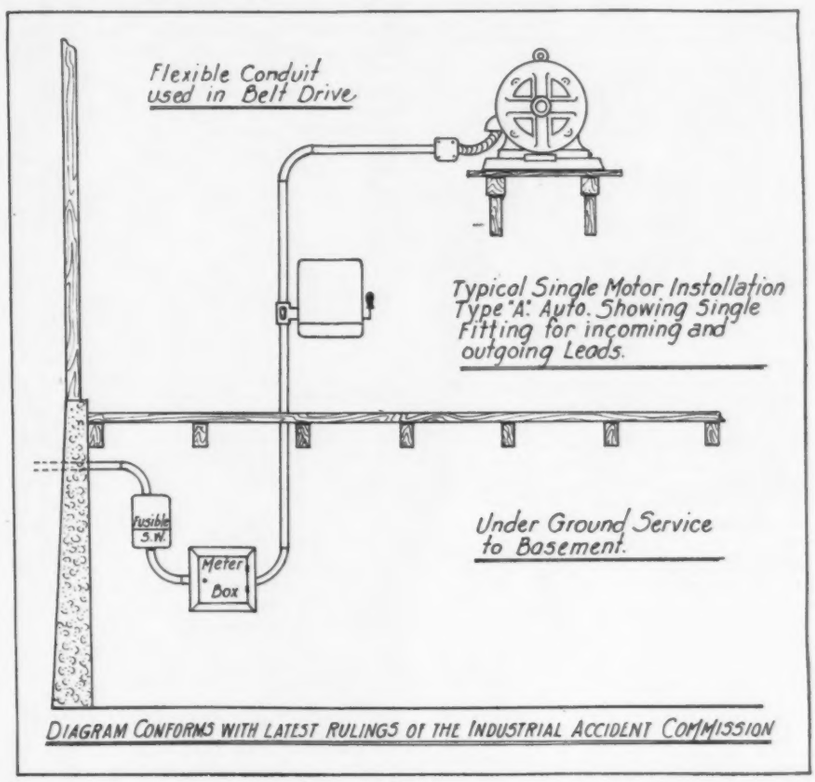

Flexible Conduit used in Belt Drive
Typical Single Motor Installation Type "A" Auto. Showing Single Fitting for incoming and outgoing Leads.
Fusible S.W.
Meter Box
Under Ground Service to Basement.
DIAGRAM CONFORMS WITH LATEST RULINGS OF THE INDUSTRIAL ACCIDENT COMMISSION

Fig. 5

BETTER MERCHANDISING

Selling the Electric Range

By W. T. RYAN*
Commercial Department, Washington Water Power Company, Spokane, Wash.

Lord Nelson was a salesman. He sold himself and his ideas to the British navy, and through the officers and sailors, to the British public. By performance, not merely by words, he gained the popular confidence to such an extent that the Admiralty had to appoint him commander-in-chief of the British fleet during the series of naval manoeuvers that culminated in the battle of Trafalgar where Nelson sealed his work with his own life. Waterloo and the downfall of Napoleon were the inevitable consequences of Trafalgar.

And Nelson followed a system—a theory of naval strategy and tactics so clear and simple that he had no difficulty whatever in impressing the principles upon all of his officers. It was not hit-or-miss fighting but cold-blooded reasoning backed up by nerve and determination that made Nelson and the British navy invincible.

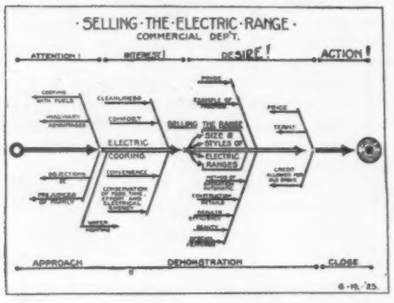


Chart used by The Washington Water Power Company in connection with its sales letter addressed to employees engaged in selling electric ranges

Nelson never heard the word "salesman". He understood "sails" not sales", but the ideas of system that he developed in his work are of great interest in modern sales work. The salesman who adopts a plan and devolps a method for effecting his sales is sure of success, and the principles that underlie the sale of automobiles, or guns, or jewelry, or cash registers apply with equal force to electric ranges.

In order to give a picture of how the electric range is sold, the accompanying diagram has been worked out. It shows a method of attack, the range prospect being the victim and the signing of the order the bullseye. In analyzing any sales of ranges that the reader has made in the past he will realize that consciously or unconsciously he followed this method and probably the same sequence of steps. In making the "approach" and in securing the "attention" of the prospect the salesman runs up against a lot of objections. These must be overcome. On the diagram they are indicated by small arrows pointing to the left, the progress of the sale being indicated by the large central arrows pointing to the right. Look at the diagram as you read this. In overcoming the objections at the start you can undoubtedly convert some or all of them into arguments in favor of the sale. For example, if wood fuel is used, you can emphasize the steadily rising prices which offset any fancied economy in its use.

If you have overcome these objections, you have certainly won the "Attention" of the prospect, and then you arouse his "Interest" by selling the idea of electric cooking. Now the arrows are all pointing toward the bullseye. Every argument on the diagram strengthens your case. Then, having sold "Electric Cooking", you determine by a few rapid questions just the particular type and style of range your customer needs or desires, and you proceed to sell him **that**, and only **that.** Note the diagram says "Selling **the** Range", not "**a**" range. Now you watch your customer for the points that impress him most, and you play up those points. At this stage you are building up "Desire", and you should give free rein to your own enthusiasm, because that will become contagious. Once your own enthusiasm and conviction is caught, your customer has the "Desire". Now for "action"—the "close".

Here for the first time you will have to talk money, terms, and credit for old range, the last kicks and squirms of the customer. It is a mistake to talk these points at all before you have built up the idea of value and created "Desire". If the preliminary work shown on the diagram has been properly done, you have created "Desire", and made "Action" inevitable. In other words, you have gained sufficient momentum to carry you safely across the last few objections and make your sale. Your customer can do nothing but make his payment and "Sign Here".

In dealing with a customer, one of the really important things to keep in mind is the necessity of controlling the conversation at all stages. The strong-minded customer is apt to seize upon some side issue and confine the subsequent discussion to it. The salesman must be sufficiently aggressive and tactful to break off such a discussion and get back upon the main line. This chart gives a well defined framework on which to hang all of the sales talk. The successful range salesman may find it of interest. If, however, he is selling ranges, he has a system and doesn't need help. The chart and this discussion is intended to help the salesman who feels some misgivings as to his own ability to sell ranges. If he has no definite system, if he sees his sales break down at certain points, this information may prove helpful. It is at any rate a system and will be better than none at all.

* A salesman's letter prepared by Mr. Ryan to outline to employees selling electric ranges the principles of salesmanship, especially as applied to electric range sales.

Electrical Idea Taught at New Kerman Union High School

When the "young idea" is an electrical idea, who can tell what electrical homes will be demanded in the near future? Already efforts in the education of the so-called "young idea" at Kerman, Calif., are beginning to bear fruit. And this is because the new Kerman Union High School has been electrified completely and those taught in it are taught electrically in so far as possible.

How the "young idea" is being educated to the benefits of electric cooking and housekeeping in the new Kerman Union High School of the San Joaquin Valley

Electrification of the Kerman High School was uppermost in the minds of the architects and builders when it was erected about a year and a half ago at a cost of $225,000. While it is not completely equipped at the present time, arrangements have been made to add to the electrical equipment from time to time as the need arises.

The domestic science department has received particular attention. The rooms are well lighted, both by daylight and artificially. Six 4.66-kw. ranges are at the disposal of the domestic science classes. A 5-kw. water heater with a 30-gal. tank furnishes hot water for the department. An electric sewing machine, irons and smaller appliances are included in the equipment.

A lunch room is operated in connection with the domestic science department, the food being prepared on the ranges in the domestic science department.

In the gymnasium hot water for shower baths is drawn from three tanks

with a total capacity of 500 gal. heated by a 5-kw. element burned for 16 hours a day during the school week. A 3-kw. air heater is used in the principal's office.

The lighting of the main high school building is worthy of mention. An abundance of daylight is provided, while 150 electric fixtures, exclusive of the auditorium and stage lights, provide artificial illumination of the indirect ray type. Bracket lamps, ceiling fixtures and a battery of footlights light the auditorium. A motion picture projecting room is wired for electrical equipment but is not yet in use.

Electric motors are used in the shops and manual training departments and for irrigation. Electroliers of the latest type light the campus.

Besides the high school proper, four bungalows, occupied by members of the teaching staff, are located on the campus. Electricity for heating, lighting and cooking is insisted on by the board of trustees because of fire hazard. The home of the principal, W. A. Otto, is almost a complete electrical home, being equipped with 6-kw. range, water heater, air heater, washing machine and appliances. The other bungalows are equipped with 5.4-kw. ranges and 3-kw. water heaters.

The Kerman High School is located on a 20-acre experimental farm three and one-half miles north of Kerman and 17 miles from Fresno. About 300 students attend, a transportation system of six buses being operated by the school.

Range Advertising Dispels the "Too Expensive" Bogey

To penetrate the sales resistance to electric ranges imposed by the thought that they are expensive, The Washington Water Power Company, Spokane, in a recent campaign on the Junior Cabinet Westinghouse range featured in its advertising the fact that an electric range costs no more than a good fuel range. To bring out this point all the campaign advertising was made to carry an itemization of the total price of the installed electric kitchen including range, water heater and boiler cover.

The idea back of this advertising was that the prospect is inclined to think in terms of an electric range alone, not realizing the other elements entering into a change from a fuel kitchen to an all-electric one. It was thought that the displayed price of $189 for the complete job, without additional explanation, would tend to confirm in the mind of the prospect a perhaps preconceived conviction that electric ranges are too expensive. To dispel this idea, the company was careful to list in its newspaper advertisements below the bold-type display of the total price the items making up this price, namely, range and water heater wiring $40, electric water heater $10, and Fiberform cover for water tank $10, showing the price of the range alone to be only $129, which compares favorably with the price of a good fuel range.

R. B. McElroy, assistant sales manager, handling the campaign, stated that this advertising had been effective in paving the way for the salesman by piercing at least one rampart of sales resistance.

Non-Electric Dealers Quick to Use Sales Plan

Oakland Furniture Dealer Uses Full-Page Ads to Sell Electric Ranges with Power Company Installation Sale

Always quick to grasp opportunities for commercial advantage, the non-electrical retailers of furniture and household supplies have been in the forefront selling electric ranges under the Pacific Gas and Electric Company's range and water heater sales plan. Realizing that electric cooking and water heating are now in demand as never before, these non-electric outlets have been eager to cooperate with the power companies for the sale of current-consuming devices in popular demand.

One of the first to take up the plan of cooperation and to advertise electric ranges extensively was a large furniture dealer in Oakland, Calif. This dealer devoted several full-page advertisements exclusively to the sale of electric ranges. He also set aside a definite display section for these ranges and for water heaters and other heating apparatus and made a special feature of this exhibit.

The Great Western and P. G. & E. plan is one of cooperation with electric dealers and with retailers who handle household appliances but who hitherto have not pushed electric appliances as one of their lines of merchandise. The effective operation of the plan is built up with the idea of eliminating the greatest difficulty in the selling of electric heating apparatus, namely, the installation cost. A method whereby this is handled has been worked out.

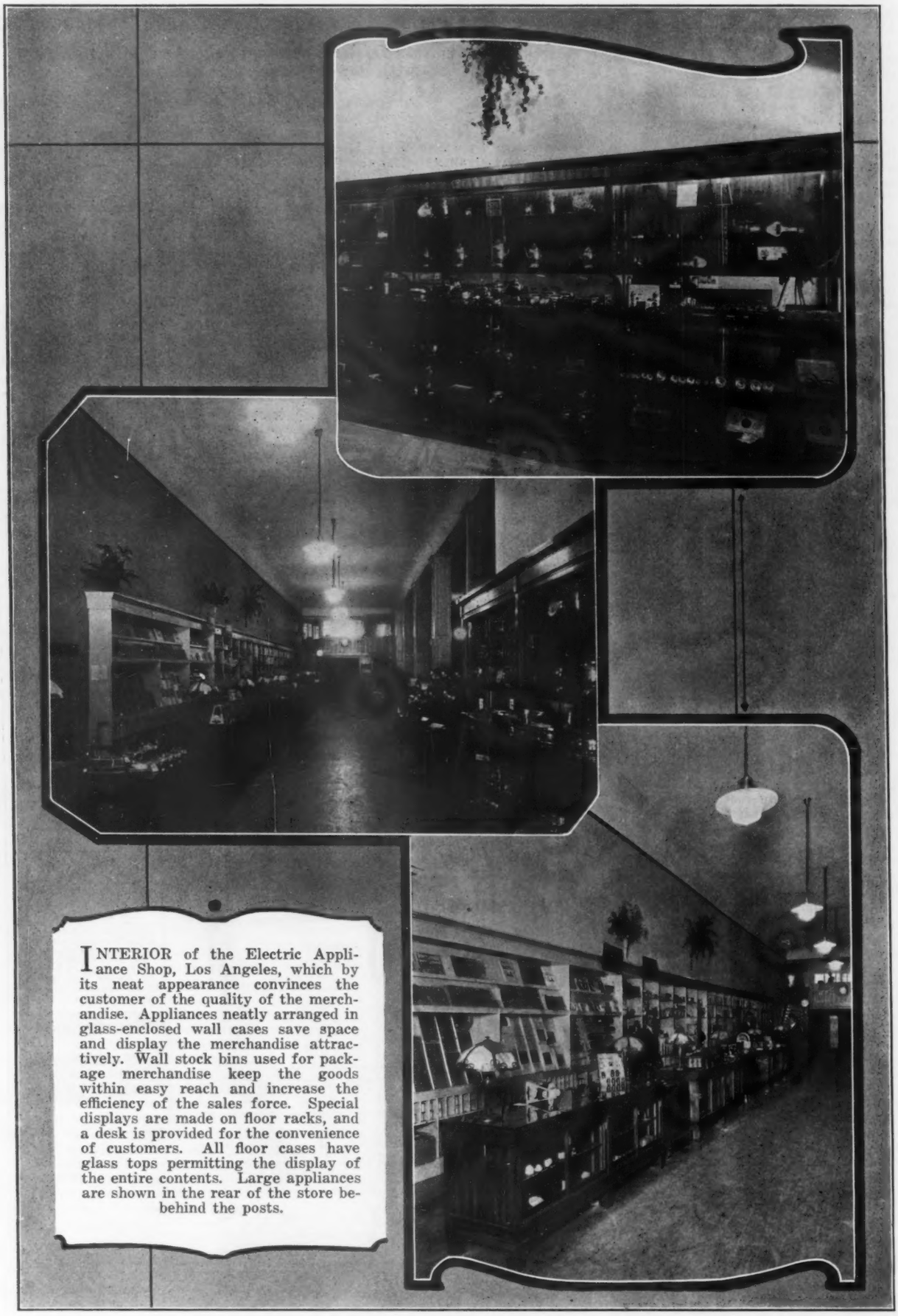
Within certain zones a definite charge for installation is quoted the purchaser of a range or water heater. If the actual installation costs more than this standard, the power company has arranged to pay the difference up to a maximum limit.

Results from this sales plan are declared to be everything hoped for at the beginning of the campaign, with the quotas being adhered to in good fashion.

Development League Elects Officers.—The Marin County Electrical Development League recently elected the following officers: president, Harvey E. Smith, master mechanic, California State Prison, San Quentin; vice-president, T. W. West, Pacific States Electric Company, San Francisco; secretary-treasurer, H. V. Patton, Pacific Gas and Electric Company, San Rafael.

JACKSON'S
Complete Home Furnishing Department Store—Oakland
CREDIT AT CASH DISCOUNT PRICES
—No Interest Charges
—No Carrying Charges
Monarch
MALLEABLE
Electric Ranges
Prices 165.00 —to— 350.00
All models sold on Credit at Cash Prices
—No Interest Charges
—No Carrying Charges
Special Terms on all models Monarch Electric Ranges
Only—10.00 deposit
—a full year to pay
245.00
10.00 deposit
— a full year to pay
MONARCH ELECTRIC—As illustrated, equipped with OVEN TEMPERATURE CONTROL. White porcelain and black enamel. Four surface burners—two ovens—broiler in the big oven. Monarch malleable iron construction throughout. Can be had with right or left oven. Same stove in full white porcelain for 275.00—same terms. Fully guaranteed.
Trade in your old stove as part payment—we'll allow you a fair price.
EXCLUSIVE MONARCH FEATURES
Exceptional quick cooking heat — both top burners and ovens. Designed especially for economy of electric current consumption.
Rust-proof Oven—built of a patented special aluminum sheet to withstand high temperature.
Oven encased in two-inch block "Asbestos" (a non-shrinking insulation of incomparable quality—a Monarch Oven Efficiency feature)
Oven Burners specially designed to distribute heat evenly in all parts of the oven.
Patented Monarch Heat-Resisting Block below all top burners prevents any downward radiation and consequent loss of heat. Radiates cooking heat long after burners are switched off.
Equipped with Automatic Vent.
Equipped with Reciprocating Switches.
Equipped with Oven Temperature Control.
Time Control Clock at a 20.00 additional cost on any model, no additional deposit. Position in action—turns current on at any time you set it for—maintains any desired temperature for the length of time you wish—and then turns off the current at the time you have desired—automatic, all by itself.
Built-in Safety Service Switch on every Monarch Malleable Electric
All Oven-Burners are "Vitreous Enamel"—non-rustable. Also coverings for oven burners, protection against oven dishes boiling over.
Oven Burners easily removed for cleaning.
210.00 MONARCH ELECTRIC
10.00 deposit
—a full year to pay.
With OVEN TEMPERATURE CONTROL. As illustrated—white porcelain and black enamel. Four surface burners. Extra large, 18-inch oven with broiler. Monarch Malleable Iron construction. Same stove in full white porcelain for 245.00—same terms. Choice of right or left oven. Fully guaranteed.
Trade in your old stove as part payment—we'll allow you a fair price
FREE SERVICE for the life of your Monarch Malleable Electric by the Pacific Gas and Electric Co. and by the Great Western Power Co. A nominal charge only for new parts—free time and labor in servicing your "Monarch" for the life of the stove.
We have sold thousands of Monarch Malleable Iron Coal Ranges in the last twenty years. The Monarch has been America's foremost range for over twenty-five years. This Monarch Electric has had a four years' successful test. We take pride in offering this line of Electric Ranges to our customers. We fully guarantee each Monarch Malleable Electric Range.—Monarch Electric prices—165.00 to 350.00.
The Highest Quality Electric Range on the market today
Monarch Malleable Electric Ranges have been tested and approved by—
American Board of Fire Underwriters
Good Housekeeping Institute
Pacific Gas and Electric Company
Great Western Power Company
Fully Guaranteed Electric Ranges
285.00 As Illustrated
10.00 deposit
— a full year to pay
MONARCH ELECTRIC—With Oven Temperature Control.
Has the Built-In Kitchen Heater. Choice of right or left ovens. As illustrated—in white porcelain and black enamel. Two ovens—broiler in the big oven. Same stove in full porcelain enamel for 325.00—same terms. An exceptional example of the highest type of construction—Monarch Malleable Iron throughout. Fully guaranteed.
Trade in your old stove as part payment.
JACKSON'S
Complete Home Furnishing Department Store—Oakland
The One-Price Store
Clay—14th—13th Streets
Lakeside 7120
The One-Price Store

Full-page ad run by an Oakland department store recently showing how a non-electrical merchant is taking advantage of electric range sales plans inaugurated by power companies of the bay cities for wider distribution of ranges and water heaters



INTERIOR of the Electric Appliance Shop, Los Angeles, which by its neat appearance convinces the customer of the quality of the merchandise. Appliances neatly arranged in glass-enclosed wall cases save space and display the merchandise attractively. Wall stock bins used for package merchandise keep the goods within easy reach and increase the efficiency of the sales force. Special displays are made on floor racks, and a desk is provided for the convenience of customers. All floor cases have glass tops permitting the display of the entire contents. Large appliances are shown in the rear of the store behind the posts.

Retail Stock is Turned Sixteen Times Each Year

Gross Business of Over $100,000 Per Year Is Recorded by The Electric Appliance Shop of Los Angeles

By G. W. BARKER

A. W. Gonnerman, proprietor of The Electric Appliance Shop, Los Angeles, seems to have solved the problem of merchandise turnover. This problem always has confronted dealers in all lines of business and particularly those engaged in selling electric appliances. Many have tried to increase their volume by taking on other lines, and others have adopted the expedient of making their stores exclusive appliance emporiums. Still others have made their businesses a combination of merchandising and construction effort and have divided their time and attention between the two interests. Mr. Gonnerman has done none of those and yet has done all.

Starting shortly after the World War with a capital of $1,200 and a comprehensive knowledge of merchandising principles and of electric appliances, in a store 20 x 30 ft., he has expanded gradually until he now occupies a place 100 x 40 ft. The volume of business has increased steadily and has been developed along sound merchandising policies. Cut prices and startling feature sales have been carefully abstained from. Sales volume has been built up by store sales alone, and the use of house-to-house salesmen has been avoided.

The merchandise handled includes everything electrical that may be applied in the home. A large part of the store is devoted to the display of washers, and these are sold on the usual time-payment basis when the purchaser so desires. This term-payment business has been handled in a way that has been found to be more profitable than usual and the net credit collection losses for the entire business have averaged less than one-half per cent per year. This has been accomplished in part by the fact that credit is extended only to persons of known responsibility or to those with sufficient credit references and also to the fact that open book accounts are collected within sixty days. No account, other than lease contracts, regardless of the firm or individual, is allowed to extend beyond the established limit. Collections on lease contracts are made promptly, and payments are not allowed to lag. Whenever an account becomes delinquent without reasonable excuse a courteous but insistent letter is sent by registered mail and a return receipt is required.

Bookkeeping is done by means of a bookkeeping machine, and a statement of accounts is made up each day. There is prepared daily a statement of condition. This work is so simplified and systematized that it takes not more than an hour and a half of time and the finished statement is ready by the middle of the forenoon.

It was decided early in the history of this business that no effort would be made to engage in house wiring. General conditions in this field of the industry seemed to promise less return for the investment and to involve greater hazard than did the merchandising of appliances. Therefore, the only wiring done by this firm is that for offices, stores and general commercial concerns. All wiring is done on a time-and-material basis. Each job, therefore, must show a profit. A small wiring crew is maintained continuously and is supplied with an automobile. This crew is able to function with exceptional efficiency on account of the fact that it has developed the spirit of team-work, always has work before it and is not confronted with the possibility of unemployment. No effort is made to take on more work than can be handled properly by the regular organization.

In the sale of apoliances Mr. Gonnerman decided to stay with the well known and advertised lines. No departure has been taken from this decision, and a pleasing volume has resulted. Recently, owing to the quality of service rendered by this store, it has been appointed southern California service station for one of the well-known lines of domestic appliances.

Appliance repairs, which always form a part of every dealer's business and which have an important bearing on his relations with his customers, are handled in an unusual way. A separate repair department is maintained under the charge of a competent appliance man, and none but the appliance repairman is allowed to quote on repairs. This centers the responsibility for the repair and for its cost and avoids all possibility of misunderstanding. The repair departments has been so conducted that it has made many friends for the store and has brought many sales that otherwise doubtless would have been lost. It always has shown a reasonable profit.

Genius has been described as "an infinite capacity for taking pains." If that is true it would seem that this store has been run by a genius for it is evident throughout the store that no care is too great to be taken in rendering service to customers. In order to save the time usually taken up in making change a pneumatic tube has been installed, connecting the various sales counters with the cashier's office. By the use of this tube system the money and sales check are conveyed to the cashier and change is made and returned while the customer's package is being wrapped. In addition to saving the time of purchasers this system also saves time for the clerks and makes it possible to handle the business of the store with a smaller force than otherwise would be necessary.

Window displays always have received the greatest consideration. No window dressing is done without a definite idea as to what merchandise is to be featured, and the arrangement is made with a careful regard to the most effective display possible. Radio has played a prominent part in the sales development of the store, and this line of merchandise is growing more rapidly than any other. For that reason one window always is given over to the display of radio sets and parts, and the latest equipment is given the most prominent place in the window. The other window is used for appliances and labor-saving devices. New appliances are featured in a conspicuous manner.

All merchandise arriving at the store is checked in by a stockkeeper and is checked out when it is removed from the stock room. The stock record shows what disposition was made of the goods, whether taken into retail stock, delivered to consumer or returned to shipper. These stock records at all times constitute a record of stock on hand and make easy the taking of inventory. All stock bins, both in the stock room and in the store, are labeled and only one item is kept in a bin. In the lamp department this is of special assistance to the sales force as it enables them to select a lamp with assurance that it will be of a voltage or wattage in accordance with the label on the bin. An original and unique lamp tester has been designed and made in the store. This permits of the testing of single and double contact automobile lamps, flashlight lamps and batteries. When a customer brings in a flashlight and says, "I don't know whether it is my lamp or my battery," it is a simple matter to determine in a few seconds which is at fault.

Extension cords in all the usual sizes are made up complete and are packed in pasteboard boxes. This makes them easy to handle and easier to wrap, keeps the stock neatly assembled, makes a handy package for the customer, and creates a favorable impression. The cost of the boxes for this purpose does not exceed two cents.

All employees work on a monthly salary. At the end of the year there is a division of the profits of the concern, after due reserves have been set aside for expansion and development. This gives every employee a personal interest in the business and an incentive to develop the spirit of the organization—service. This business has been built up by fair dealing; by close attention to the demands of the customers; by rendering a service beyond the mere exchange of money for merchandise; by conservative buying and by stimulating turnover.

By means of the careful records kept and by conservative buying the stock turnover in this store has been brought up to an average of sixteen times a year.

For the convenience of prospects and customers a small space in the store has been rented to a sewing-machine manufacturer for the display and sale of electrically operated domestic sewing machines. Very often people who have come into the store merely to see sewing machines are attracted by the display of other electrical merchandise, and sales are thus made that otherwise would have been lost. The same thing happens in the case of a dealer in therapeutic instruments, who has leased a small portion of the store; doctors who have come in to buy medical apparatus have gone out with many dollars worth of electrical appliances, lamps and other devices. The patronage of the medical profession has grown to marked proportions, and this growth has been assisted in part by clinics that have been held in the store for the demonstration of therapeutic apparatus.

NEWS OF THE INDUSTRY

Western Power Corporation Acquired by North American Company in Recent Deal

In the limelight not long ago because of its purchase of the San Joaquin Light & Power Corporation and the Great Western Power Company of California, the Western Power Corporation itself was acquired recently by the North American Company of New York, according to an announcement made to the press by H. P. Wilson, president of the Western Power Corporation. Thereby, control of the Great Western Power Company of California and the San Joaquin Light & Power Corporation also will be transferred to the North American Company, a large holding company whose principal properties are centered about St. Louis and adjacent country.

The basis of the acquisition proposed, and which was expected to be carried through, included an exchange of Western Power Corporation common stock for North American common stock, at the rate of 1¼ shares of North American for 1 of Western Power. Western Power stockholders are to be given the option of taking cash at the equivalent of $75 a share. This plan, according to Mr. Wilson, has been approved by a substantial proportion of the stockholders of the Western Power Corporation, to whom it has been submitted. Western Power's common stock outstanding consists of 219,200 shares of no par value, of which 72,500 shares were issued to stockholders of preferred and common stock of the company in January, this year, at $35 a share. There also is outstanding 70,800 shares of 7 per cent cumulative preferred stock of $100 par value.

The Western Power Corporation is the holding company for the Great Western Power Company of California and the California Electric Generating Company, and early this year acquired the San Joaquin Light & Power Corporation and its subsidiaries, the Midland Counties Public Service Corporation and the Fresno City Water Corporation. (Journal of Electricity, Dec. 15, 1924, p. 454.) The Great Western Power Company and California Electric Generating Company serve in sixteen counties in California, included in which are the cities of San Francisco, Oakland and Sacramento. The aggregate earnings of the Western Power Corporation's companies are in excess of $17,000,000 annually.

Los Angeles Division General Electric Plans New Buildings at Vernon

The General Electric Company is to begin work immediately on a large warehouse and an office building on a five-acre site of ground at Santa Fe Avenue and East 52nd Street, Los Angeles. Present plans call for the immediate expenditure of approximately $300,000, but it is expected that fully $1,000,000 will be expended on this plant eventually.

The warehouse, which is to be a three-story structure, 80 x 240 ft., is to be so built as to permit the addition of two more floors as the necessity for more space grows. The office building will be a two-story structure containing 16,000 sq.ft. of floor space. Both structures will make use of the very latest electrical equipment. The office building will be heated electrically.

The Austin Company of California designed the structures and are to be in charge of the work. The Newbery Electric Company has been awarded the wiring contract.

Architect's drawing of the proposed new warehouse and office buildings to be erected in Los Angeles for the General Electric Company, southern Californa division

Transmission Line Contracts Let by Edison Company

Contracts for towers, conductors and insulators for the 220-kv. Vincent line of the Southern California Edison Company have been awarded. The tower contract was divided between the Pacific Coast Steel Company, San Francisco, and the Newport News Shipbuilding & Dry Dock Company, Newport News, Va. Conductors will be supplied by the Aluminum Company of America, Pittsburgh, Pa. Insulators will be furnished by the Westinghouse High Voltage Insulator Company, Emeryville, Calif.

The line, on which construction began Sept. 1, will be the third 220-kv. transmission line leading from the Edison company's plants in the vicinity of Big Creek, Fresno County, Calif., to southern California. The new single-circuit line will connect Big Creek 3 and Cresenta switching station, near Laguna Bell substation, southeast of Los Angeles. It will be 223½ miles in length.

About 800 towers will be furnished by the two successful bidders. The Newport News Ship Building and Dry Dock Company will supply approximately two-thirds of the standard 60-ft. towers and the Pacific Coast Steel Company will furnish the special towers and one-third of the standard type. The maximum working tension on the line is to be approximately 36,000 lb. The tower contracts call for about 6,000 tons of steel.

The contract for conductors for the line was secured by the San Francisco office of the Aluminum Company of America and calls for 680 miles of 1,033,500-circ.mil concentrically stranded steel reinforced cable, consisting of seven central strands of steel and fifty-four strands of aluminum. This cable will weigh approximately 7,030 lb. per mile of wire and will have an outside diameter of 1.247 in. Deliveries are to be in four equal portions, the first to be made the latter part of the present year and the last early in 1927.

All of the insulators for the line are to be manufactured in the Emeryville plant of the Westinghouse High Voltage Insulator Company.

Pacific Coast Electrical Association Moves.—The Pacific Coast Electrical Association recently announced the removal of its offices from the Rialto Building, San Francisco, to 447 Sutter Street (Rooms 729-730), that city.

Industrial Lighting Activity Plan Book Prepared by Lighting Committee

The Industrial Lighting Committee of the National Electric Light Association, which is conducting the Industrial Lighting Activity, has prepared a Plan Book which offers "a complete plan of organization of local communities for the operation of a nation-wide campaign to increase sales and profits on industrial lighting installations."

In addition to formulating the complete plan, the Industrial Lighting Committee will carry on a campaign of industrial lighting advertising in national, business, management and class magazines; will furnish sales, lectures and advertising suggestions to assist local groups in carrying out their campaign, and will provide salesmen to explain the activity and assist in organizing the local groups. The Plan Book points out that the national campaign is the first half of the activity but that it will be of little avail if the electrical interest of the town or city do not follow the plan and carry out the second half of the activity. The local community need not follow all of the steps laid down by the Industrial Lighting Committee, but should formulate some plan that will fit the needs of the locality best.

The plan, as outlined in the Plan Book, covers a direct-mail campaign, tied in with the national advertising campaign; a newspaper advertising campaign; a lighting demonstration; a motion picture film, "Productive Lighting in Industry", to be shown at meettings of Chambers of Commerce, Rotary Clubs and similar organizations; trial installation; industrial lighting talks, and industrial lighting schools. Suggestions are made for the use of the different campaigns, for the making up of lists, and for followups. Forms for making factory layouts and for the obtaining of field notes of an industrial plant by local communities will be provided by the Industrial Lighting Committee. The Brayton portable projector, 10½ in. high and weighing 4 lb., which may be carried in a brief case, is suggested for use with the film instead of a lantern-slide projector.

Three typical local plans are given, one as proposed by the Edison Electric Illuminating Company of Boston, one by the Cincinnati Electric Club, and the third by the Cleveland Electric League. The book also contains three broadsides, sample invitation to demontration and order blanks for material.

In order to stimulate the local groups in the activity, the Industrial Lighting Committee is offering three prizes based upon the work done and the accomplishments of the individual committees. These prizes are: first, $2,500; second, $1,500; and third, $1,000. They will be awarded upon: 1—The percentage of factories in communities brought up to a higher standard of lighting by the activity in the period of the Industrial Lighting Committee's program from Sept. 1, 1925, to March 1, 1926; 2—The excellence of the report based upon its value to the rest of the industry in facts and figures; 3—Evidence of an educational activity to industrial plants, civic and business groups on industrial lighting economies; that is, increased production, decreased spoilage, fewer accidents, less labor turnover. The prize money will be given to the local electrical league or local organization conducting the activity to be used in any manner it sees fit. All reports must be in the hands of the Industrial Lighting Committee, National Electric Light Association, 29 West 39th Street, New York City, by April 1, 1926.

The Plan Book lists the geographic chairmen who will handle the activity throughout the country, and the territory covered by each division. In the West these are: Rocky Mountain Division—C. E. Addie, Public Service Company of Colorado, Denver, the states of Colorado, New Mexico and Wyoming; Northwest Division—J. F. Orr, Idaho Power Company, Boise, the states of Idaho, Montana and Utah; H. J. Gille, Puget Sound Power & Light Company, Seattle, the states of Oregon and Washington; Pacific Coast Division—A. M. Frost, San Joaquin Light & Power Corporation, Fresno, Calif., the states of Arizona, California and Nevada.

The New Service Department of Westinghouse at Emeryville

What is claimed by the Westinghouse Electric & Manufacturing Company of East Pittsburgh to be one of the largest and best equipped electrical repair shops west of Chicago is its San Francisco service department, which occupies the front section of the new Westinghouse Building in Emeryville, Calif.

This building is a three-story structure of the most modern type. All the side walls and the roof of the center bay are glassed in so that the entire interior is flooded with sunlight. Ample room for future expansion has been provided for, as the company owns a large tract of land between this new building and the plant of the Westinghouse High Voltage Insulator Company. The building was designed to serve as the Pacific Coast distributing point for the East Pittsburgh works. A large section of it will be occupied by the assembly department. Another wing will be devoted to the zone warehouse stock.

The service department is well equipped to handle all kinds of electrical repair work, large and small. Many of the processes, insulating materials and varnishes used at East Pittsburgh are employed in this department to insure the best possible results.

Special care is given to coil winding and impregnation. Three automatic electric bake ovens are installed for baking out coils. A 150-ton hydraulic press is used for pressing large rotors on and off shafts.

The machine shop at one end of the main aisle has all the usual machines, with special machines for key-seating pulleys and babbitting bearings. Traveling cranes facilitate the handling of all apparatus in the shop.

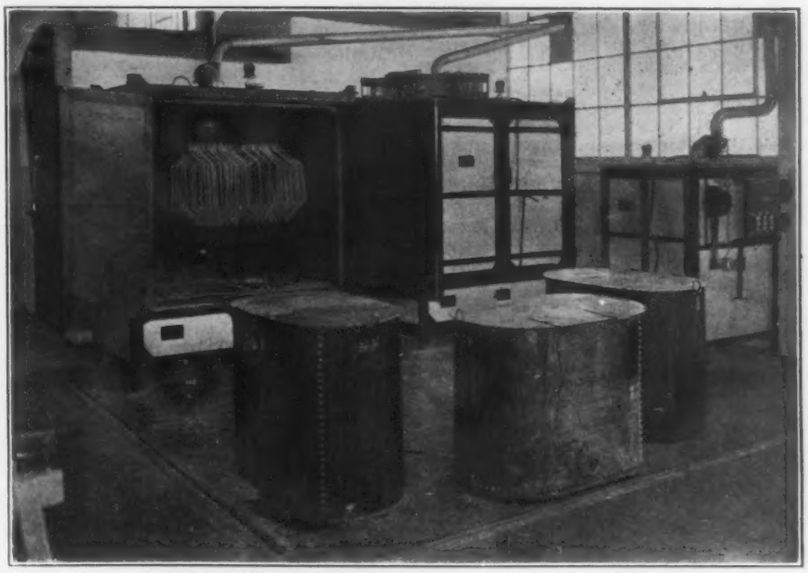
An elaborate test switchboard enables the operator to determine several important factors simultaneously when testing apparatus. A portable testing set is arranged for general shop use, but as far as possible all apparatus is given running tests and final inspection at the main testing switchboard.

The switchboard manufacturing department is located on the second floor. Long racks are provided for the assembly of large power switchboards, while small panel boards and automatic control equipment of all kinds is assembled at the benches. The switchboard department has its own designing engineers and draftsmen.

The steam division does most of its steam-turbine repairing and reblading on the job, but some classes of mechanical repairs are handled at Emeryville.

The facilities of the service department will be increased as the needs of the future demand.

Utah Town Contemplates Whiteway Lighting System.—The town of Payson, Utah, is contemplating the installation of a new "Whiteway" lighting system. Bids have been called for, and it is expected that work will begin in the near future. The initial installation will cover four blocks on Main Street, with ten metal standards to the block.

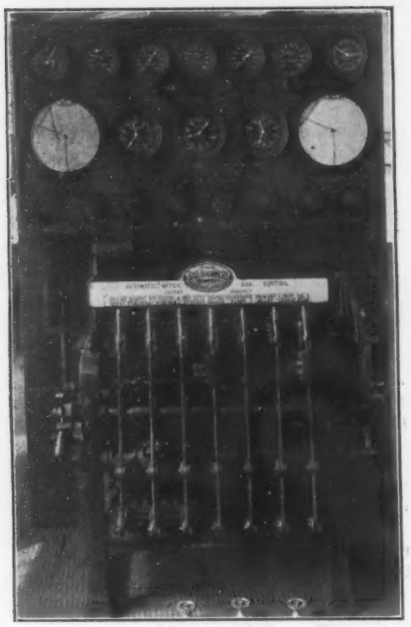


Three automatic electric bake ovens and coil-dipping tanks form part of the equipment in the Westinghouse Electric & Manufacturing Company's service department at Emeryville, Calif.

Manufacture of Gas Controlled by Electrical Device

Oddly enough, electricity plays the role of gas-maker as a result of a recent improvement in gas-making machinery, which allows an electric motor to serve the purpose of an operator. Such an electrical automatic control system has just been installed on the new oil gas set recently completed by the San Diego Consolidated Gas & Electric Company. The new gas generator has a capacity of 5,000,000 cu. ft. per day.

As shown in the accompanying photograph, a small electric motor is used for



Electrically operated automatic gas-making control system recently installed by the San Diego Consolidated Gas & Electric Company.

motive power for the automatic control mechanism. Making gas requires a series of timed operations in certain prescribed order. In the past this has required an experienced operator.

The new mechanism, manufactured by the Gas Machinery Company of Cleveland, is actuated by a series of cams, arranged to rotate on a shaft driven by the electric motor. The speed of the shaft is regulated by means of gears. As the shaft rotates, each cam in its proper turn opens the corresponding control valve, causing the particular operation it governs in the manufacture of the gas to be accomplished. Optional manual controls are also provided as auxiliary, the whole control board occupying a small space and making a neat appearance.

S.E.D. Inaugurates Publication of Another News Service

The first issue of a new monthly news service to newspapers, devoted entirely to the subject of city delivery and materials handling methods, recently was released by The Society for Electrical Development. This service, supplementing the society's weekly news service, now being sent weekly to approximately 800 newspapers reaching more than 29,000,000 readers, will be sent to the same list of newspapers. It will contain extracts from current magazine articles and other data regarding the use of electricity in the field of city transportation and delivery and in the handling of commodities at ports and terminals, loading platforms and factories. The first issue contains four full newspaper columns.

This latest service to newspaper editors probably will be developed into an industrial news service covering the application of electrical service for industrial and commercial purposes. The weekly news services contain chiefly information concerning the use of electricity in the home.

Developed in connection with the electric truck business development program, which the society is carrying on in cooperation with the manufacture of electrical trucks, batteries and accessories, this service will be sent also to twenty news syndicates serving several hundred newspapers each.

Changes in Personnel Announced by Edison Company

The department of substation operation of the Southern California Edison Company, Los Angeles, has been reorganized. According to a statement by L. L. Dyer, superintendent of substation operation, the present divisional territory is too large to be covered by three divisions, and consequently a fourth, to be known as the southern division, has been created. A. P. Sessions, formerly assistant to the substation engineer, will be in charge. The eastern, western and northern divisions are under the supervision of R. W. Graves, M. C. Hilliard, and J. B. Witte, respectively. The latter until recently was equipment supervisor of the northern division of the protection engineering department of the company. All division headquarters will be located in the Edison Building, Los Angeles, with the exception of the northern division, which is located at the Edison office in Visalia.

The Edison company also has made a change in its distribution department. L. W. Thompson, formerly superintendent of the coast division of that department, has been appointed material engineer to represent the operating department at the general store. His successor is J. F. Hodges, who was formerly superintendent of the Long Beach district. Under Mr. Hodges' supervision will come the distribution department of thirteen districts, including all those between Huntington Beach and Santa Barbara.

Westinghouse Company Compiles Data on Development of Electric Locomotive.—A reprint of a paper on "The Development of the Electric Locomotive" originally presented before the meeting of the American Railway Association at Atlantic City in June, 1924, has been completed by the Westinghouse Electric & Manufacturing Company. The paper comprises twenty pages of descriptive matter pointing out the salient facts incident to electric locomotive progress. A valuable supplement contains two large charts compiled from electrical and mechanical characteristics of all a.c. and d.c. electric locomotives in operation in this country and abroad. These charts in themselves are most complete and accurate and will provide a ready reference to any one interested in this type of motive power.

Applications for Water Rights Increasing in California

An interesting situation with regard to water matters in California, particularly with reference to the number of applications for water appropriation, is revealed by the report of Edward Hyatt, Jr., chief of Division of Water Rights, State Department of Public Works, for the year 1924.

In 1914, when the office was opened, five applications were received; in 1924 the number was 631. During the first four years applications were received at an average yearly rate of 285; from 1920 to 1923 the rate increased to 542; and in 1924 the total received was 89 more than the average of the preceding four years and 64 more than in any preceding year of the history of the office.

A total of 635 applications were disposed of, 371 by approval and 264 by cancellation. The applications approved proposed the appropriation of a total of 27,907 sec.-ft. and 1,627,010 acre-ft. of water per annum. Of this 1,409 sec.-ft. and 133,243 acre-ft. were for agricultural purposes; 26,368 sec.-ft. and 1,491,767 acre-ft. were for power purposes; and the remainder for mining, municipal and domestic uses. Of the permits issued, those given to the Southern California Edison Company, Los Angeles, for its proposed Big Creek project on San Joaquin River cover the largest single development. This project contemplates the development of an ultimate total of 1,495,500 hp. and the utilization of the regulated flow of approximately 7,700 ft. above sea level and a lower elevation of approximately 1,000 ft. above sea level.

During 1924 progress was made toward the completion of adjudication proceedings on eight different streams, those relating to Hat Creek in Shasta County and Oak Creek in Inyo County having been completed and decrees entered.

Manufacturer of Scientific Instruments Issues General Catalog.—Adam Hilger, Ltd., 75a Camden Road, London, N. W. 1, has issued recently a general catalog covering its complete line of manufactures. The book is divided into sections, which are tab-indexed as follows: B—Echelon diffraction grating and Lummer-Gehrcke parallel plates; C—spectrometers and goniometers; D — wavelength spectrometers, monochromators and specialized spectroscopes; E—spectrographs; F—accessories; H—spectrophotometers, colorimeters, etc.; K—diffraction gratings; L—micrometers, etc.; M—polarimeters and refractometers; N—interferometers; O—spectroscopic apparatus; P—optical work; R—Low-Hilger audiometer. There are also an index of sections and a general index. The catalog contains much detailed data and is profusely illustrated.

Circulars on Foreign Electrification Issued by Department of Commerce.—The Department of Commerce, Bureau of Foreign and Domestic Commerce, Electrical Equipment Division, has issued circulars on rural electrification in foreign countries as follows: No. 295, Denmark; 297, New Zealand; 300, Italy; 301, France; 307, Sweden; 308, The Netherlands; 309, Great Britain; 311, Germany; 323, Finland.

Denver Electrical League Issues Fourth Annual Report

The fourth annual report of the Advisory Board of the Electrical Cooperative League of Denver recently has been published in pamphlet form. Among the subjects covered are: Purposes of the Electrical League; Organization and Operation; The Advisory Board, Officers and Staff; A Retrospect of Four Years; Condensed Financial Report; Field Work as an Educational Medium; Home Lighting Essay Contest; Denver's Third Electrical Home; Publicity and the Printed Word; Christmas Campaign and Holiday Lighting; A Glance at the Social Side; Miscellaneous Activities, which include Information Bureau, Improved Wiring Rules, Outside Meetings, Lighting Demonstrations, Radio and Weekly Bulletins; Plans for the Fifth Year, and Summary.

The report shows that for the four years of its existence the League has had a total income of $53,674.92, and that the actual expenditures for that period have been $53,028.95. For the year ending June 30, 1925, the total income amounted to $14,080.15, and the total disbursements to $13,434.18.

The League has found field service work a most effective means of carrying the electrical message to the public, and as a result of this work and the related activities its records show the addition of 8,944 outlets, of which 2,822 have been installed on 140 completed jobs, the remainder being additions to work contemplated or actually under construction but not completed at the close of the year.

According to the plans adopted by the Advisory Board for the new fiscal year, July, 1925-June, 1926, inclusive, all of the major activities in which the League has been engaged are to be continued, with emphasis on business building operations. The principal items of the program committee report adopted follow:

Membership—To secure membership in pledges for the coming year and to collect any and all outstanding subscriptions as soon as possible in order that the work of the new year will not be hampered.

Financing—To confine activities as permitted by the budget, and in order to insure the complete program, to secure as much financial assistance as possible and to keep expenses at their present low minimum.

Attendance—To insure and increase attendance at Board meetings, and other gatherings, by impressing the responsibility upon company executives because of the tendency to delegate matters of this nature.

Entertainment—To give more consideration to the social or entertainment phase of the program by charging the entertainment committee with added responsibilities, including that of arranging meetings when any distinguished member of the industry is visiting in Denver.

Constitution—The consideration and formulation of a constitution or more definite set of working rules provided there is a definite desire for such action as ascertained by the special committee appointed for this purpose.

Dealer Aid—To recommend seasonal merchandising campaigns but only to give such assistance as might be desired and requested by dealer members.

Electric Homes—To confine electrical home exhibitions to one a year unless arrangements can be made whereby other interested parties will assume the burden of expense in which case additional demonstrations might be considered and approved.

Red Seal Plan—To inaugurate a Red Seal activity after complete information has been obtained and definite plans outlined for its successful operation and financing over an adequate period.

Budget—The total budget $13,500.00 to remain the same as last year.

Officers elected for the fifth year are:

Chairman—A. C. Cornell, manager, Western Electric Company; vice-chairman—W. A. J. Guscott, Electragist; vice-chairman—E. P. Kipp, western sales manager, Hazard Manufacturing Company; vice-chairman—F. F. McCammon, power sales engineer, Public Service Company of Colorado; secretary—E. A. Scott, Scott Bros. Electric Company; treasurer—D. D. Clark, Denver Commercial Manager, Mountain States Telephone & Telegraph Company.

Reduction in Rates Announced by Utility of Longview, Wash.—The Longview Public Service Company, Longview, Wash., announced new rates, effective Sept. 1, effecting a reduction of 15 per cent in residential lighting, and the same reduction for the primary rate up to and including 100 kw-hr. in commercial lighting. The residential rate was reduced from 10 cents to 8½ cents per kw-hr. for the first 60 kw. used, and the commercial rate was cut to the same figure on the first 100 kw. used. The company has had an increase of 40 per cent in the total number of customers in the past six months.

Time Extension Granted Aberdeen in Hydroelectric Project

Announcement that he has granted the city of Aberdeen, Wash., an extension of time until Sept. 1, 1926, in which to begin construction on its proposed hydroelectric development and city water system on the Wynooche River in Grays Harbor County was made Aug. 28 by R. K. Tiffany, state supervisor of hydraulics. The announcement is tantamount to a victory for the city of Aberdeen in the battle which it has been waging for virtually two years in an endeavor to obtain extension of the time limit within which the city must begin construction work on its proposed $2,000,000 hydroelectric and municipal water development.

In announcing granting of the extension Mr. Tiffany stipulated that the city of Aberdeen must proceed with reasonable diligence in carrying on the proposed construction work. The decision provides that actual construction must be commenced by Sept. 1, 1926, and must be completed by Sept. 1, 1928.

Granting of the time extension follows a hearing held before the state supervisor of hydraulics at Olympia July 17, 1925, (Journal of Electricity, Aug. 15, 1925, p. 144). The hearing was for the purpose of compelling the city of Aberdeen to show cause why the permit which it held should not be cancelled because of failure on the part of the city to proceed with construction of the project.

The permit held by the city of Aberdeen is for appropriation of 600 sec.ft. of water from the Wynooche River. The permit originally was issued by the state hydraulics engineer to J. E. Malinowski on Oct. 25, 1922, and was assigned to the city of Aberdeen Sept. 29, 1924, by Malinowski.

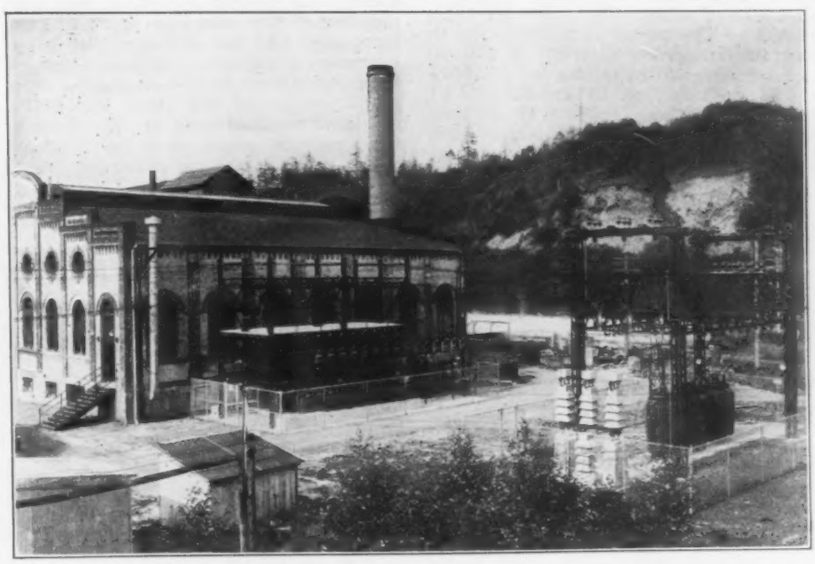
In his decision, Mr. Tiffany stated that evidence presented at the hearing led him to believe that the city of Aberdeen had been working with Mr. Malinowski in good faith to develop a supplemental water supply and that legal delays and the magnitude of the project constituted sufficient excuse for granting the city an additional extension of time in which to begin construction. He further expressed the belief that the Wishkah River, the source of Aberdeen's present water supply, was insufficient for this purpose.

The Simpson Logging Company, the Polson Logging Company and the Grays Harbor Light & Power Company, protested against granting the city an extension of time. (Journal of Electricity, April 15, 1925, p. 297.)

Aberdeen Utility's Rebuilding Practically Completed

With the installation of the new 5,000-kw. turbo-generator in the Electric Park Station of the Grays Harbor Railway & Light Company, Aberdeen, Wash., and of the 5,000-kw. bank of 13,000/4,150-volt transformers in the yard outside the station, the rebuilding program of that company (Journal of Electricity, Sept. 1, 1924, p. 181) practically has been completed.

The structure near the building in the accompanying picture contains switches and feeder regulators for the six 4,150-volt feeders leaving the station. All the company's distribution lines now center at and are controlled from this point.



The Electric Park Station of the Grays Harbor Railway & Light Company at Aberdeen, Wash., where all of the company's lines now center and from which they are controlled

Nevada Irrigation District Asks Commission to Reconsider Yuba River Application

The application of the Nevada Irrigation District for power rights on the Yuba River is to be reconsidered by the Federal Power Commission. The staff of the commission had made an adverse finding in connection with this application. On the basis of a new situation created by the redesign of the Milton-Bowman tunnel and the consequent reduction in the cost of the so-called mountain division of the project, the reconsideration is to be made.

That the matter was certain to come before the commission itself was seen, following the formal notice of appeal made by the irrigation district. The Yuba River Power Company had decided to appeal from any decision to allow the irrigation district to develop the power project should its application for reconsideration be denied. For that reason it was decided to bring the matter before the commission at the earliest possible date. A meeting for that purpose will be held Sept. 21. The irrigation district has entered into financial arrangements which require it to make the delivery of certain bonds on Oct. 8. For that reason it was felt by the district that it is entitled to an answer prior to that time.

The Pacific Gas and Electric Company is to be allowed to make use of the water before it is turned into the irrigation system. The irrigation district has a contract with that company which proposes the routing of one-third of the water through the Deer Creek plant of the company and the remainder through its Bear River plants. Provision is made also for temporary use of the water at the Halsey and Wise power houses, with the right to use the water in any plants that may be built in the future on Bear River. The contract calls for payment, partially on an acre-ft. basis, and partially on the number of kilowatt-hours generated and the amount of water delivered. After the first twenty-five years payment is to be wholly on a kilowatt-hour basis. The rate is three-fourths of a mill per kw-hr. for all energy generated from district water in any plant of the company.

An analysis of the proposition first submitted, in the opinion of the staff of the Federal Power Commission, indicated that the returns for the sale of power would not carry a sufficient proportion of the interest and charges on the Milton diversion to make practicable the district lands assuming the cost of the development. This situation, however, has been modified considerably through redesign and consequent reduction in cost of storage and diversion works on the mountain division.

Melones Dam Power Agreement Approved by Commission

Approval was given by the Railroad Commission Sept. 4 to an agreement between the Pacific Gas and Electric Company and the Sierra & San Francisco Power Company (now operated under lease by the Pacific Gas and Electric Company) on the one hand, and Oakdale and South San Joaquin Irrigation Districts on the other hand, under which the power corporation will build a power plant of two units of 13,500-k.v.a capacity, or about 30,000 hp., below the Melones Dam costing $2,530,000, and transmission lines to Copperopolis and Manteca, costing $158,000. (Journal of Electricity, June 15, 1925, p. 602.) The power companies are to pay the irrigation districts $5,175,000 in semi-annual installments of $64,680.50, payable Dec. 15 and June 15 of each year. These funds will be used by the districts to pay interest upon bonds issued for the purpose of constructing the Melones Dam, and to purchase and cancel from time to time outstanding bonds of the project; and also for such other purposes as the district may desire.

Until the entire amount of $5,175,000 has been paid by the power corporations the districts are to bear the cost of maintaining Melones dam and reservoir. Upon the completion of such payment the power corporations are to bear one-half the cost of maintaining the dam and reservoir.

Upon the granting of approval, contracts were let by the district for the dam at Melones, the expectation being that the work can be completed in time to catch next spring's flood waters. The Pacific Gas and Electric Company plans to have the power house completed by next fall.

Byllesby & Co. to Change Stock Ownership Plan

Notice was given formally to stockholders of H. M. Byllesby & Company of a meeting of stockholders Sept. 1 to change the stock ownership plan of the company. The plan contemplates the calling in of the preferred and common stocks of the company and the issuing in their stead a new preferred stock, a Class A common stock, and a Class B common stock, the latter to retain the voting power.

In his statement to stockholders, J. J. O'Brien, president of H. M. Byllesby & Company, gives as the reason for the change the demand for stock from employees of the operated and affiliated companies and the desire of the home company to permit employees to make such investment in the company. The redistribution of the stock will make available several large blocks of stock for employee purchase without affecting the personnel, management and control of the company.

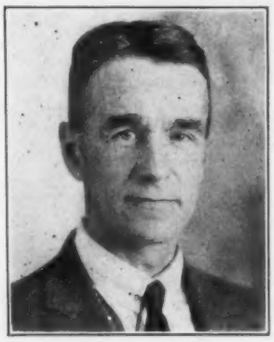
Preferred stock of $100 par value and common stock according to the plan, is to be exchanged for new preferred and common in the following proportions: For each share of preferred will be given five shares of the new preferred which is without par value but which represents about $20 in assets and two shares of the new Class B common or voting stock, with a similar value in assets and also without par value. For each share of former common, five shares of the new Class A common and eight shares of the new Class B common or voting stock will be given.

The new plan will authorize 925,000 shares of stock, 175,000 of which will be the new preferred, 400,000 of the new Class A common, and 350,000 of the new Class B common.

B. C. Electric Company Awards Prizes in Essay Contest

An essay contest for employees on the subject of "How Good Public Relations Can Best Be Developed and Maintained on a Sound Business Basis" recently was concluded by the British Columbia Electric Railway Company, which supplies transportation, light, power and gas in Vancouver, Victoria and New Westminster.

Prizes in the amount of $115 were offered, divided into a first prize of $50, a second of $25, a third of $10, and six prizes of $5 each. George Kidd, president of the company, presented the awards at a luncheon at which he entertained all the writers of essays and the officials of the company.



J. TEASDALE

The first prize was won by J. Teasdale, load dispatcher, Vancouver. Mr. Teasdale emphasized the importance of good service and good rates; of fairness and justice in company dealings; a forward-looking policy as regards extensions, improvements and changes; full information about all company affairs; of continuous advertising; of customer-ownership; and of the careful selection of employees who contact the public.

The second prize was awarded to John Macdonald, conductor, Vancouver; the third to J. G. McLean, track foreman, Vancouver; the fourth to R. L. Forse, operator, Stave Falls plant; the fifth to Bernard Neise, conductor, Vancouver, and the sixth to R. L. Trimnell, operator, Matsqui substation. Additional prizes were won by F. T. Yates, light and power office, Vancouver; Wilfrid Turner, car operator, Victoria; and W. A. Vance, audit department, Vancouver.

That sixty-five employees submitted essays in the middle of the vacation season was considered gratifying by the company. Not only did it indicate keen interest in the subject but many valuable suggestions were received.

City of Tacoma Plans for New Substation and Office Building.—Plans are under way in the Tacoma city engineer's office for the new $100,000 substation and office building to be erected at South 7th and Broadway. The structure will be four stories high and will house the accounting and drafting departments of the city light and water department. The city council has under consideration three ordinances authorizing the purchase of sites for new secondary substations for the city light department, to be operated in connection with the Cushman power distribution system.

P. C. E. A. Technical Section Chairmen Announced

Rounding into shape the organization of the P.C.E.A. Technical Section for the ensuing year, all committee chairmanship appointments have been made and confirmed. It is the policy of the Section to select those who have shown interest and aptitude in the various divisions of the work of the Section for the chairmen of the several committees. The list of appointees for the coming year contains the names of men who need no introduction to the men of the industry.

In accordance with the newly established policy of the Section, each committee will have a vice-chairman. These vice-chairmen will be appointed as soon as committee chairmen have had time to effect their programs and organization for the coming period. As is the usual custom, the retiring chairmen will continue to serve on the executive committee.

Executive personnel for the 1925-26 period is as given in the following list:

Executive Committee—Chairman, R. R. Cowles, Pacific Gas and Electric Company, San Francisco; vice-chairman, J. G. Rollow, Los Angeles Gas and Electric Corporation, Los Angeles.

Accident Prevention Committee—Chairman, J. M. Buswell, San Joaquin Light & Power Corporation, Fresno, Calif.

Electrical Apparatus Committee—Chairman, J. C. Gaylord, Southern California Edison Company, Los Angeles.

Hydraulic Power Committee—Chairman, Walter Dreyer, Pacific Gas and Electric Company, San Francisco.

Inductive Co-ordination Committee—Chairman, H. N. Kalb, San Joaquin Light & Power Corporation, Fresno.

Meter Committee—Chairman, R. E. Jones, The Southern Sierras Power Company, Riverside, Calif.

Overhead Systems Committee—Chairman, G. A. Riley, Los Angeles Gas and Electric Corporation, Los Angeles.

Prime Movers Committee—Chairman, J. W. Andree, Southern California Edison Company, Los Angeles.

Safety Rules Committee—Chairman, W. R. Frampton, Southern California Edison Company.

Underground Systems Committee—Chairman, P. E. Chapman, Pacific Gas and Electric Company.

Pacific Coast Vice-Chairmen of Lighting Campaign Named

Announcement has been made by A. M. Frost, geographic chairman of the Pacific Coast Division of the Industrial Lighting Committee. of the appointment of the vice-chairmen who will handle under his supervision the details of the Industrial Lighting Activity in that territory. These men are:

For California—C. D. Monteith, Pacific Gas and Electric Company, San Francisco; H. H. Allison, Great Western Power Company, San Francisco; M. L. Foster, Coast Counties Gas & Electric Company, Santa Cruz; J. F. Pollard, Coast Valleys Gas & Electric Company, Salinas; R. C. Bragg, Vallejo Electric Light & Power Company, Vallejo; Frank Weiss, Los Angeles Gas and Electric Corporation, Los Angeles; A. W. Childs, Southern California Edison Company, Los Angeles; W. R. Chawner, The Southern Sierras Power Company, Riverside; G. H. P. Dellman, San Diego Consolidated Gas & Electric Company, San Diego; H. K. Griffin, Western States Gas & Electric Company, Stockton; G. A. Ferguson, Western States Gas & Electric Company, Eureka; G. D. Smith, Ontario Power Company, Ontario; and C. B. Merrick, San Joaquin Light & Power Corporation, Fresno.

For Nevada—O. S. Clifford, Truckee River Power Company, Reno.

For Arizona—R. V. Sanford, Tucson Gas, Electric Light & Power Company, Tucson.

For Hawaii—J. F. Fenwick, Hawaiian Electric Company, Honolulu.

The duties of these men, as set forth by the chairman, will be to survey the industrial lighting possibilities in their respective territories by having power salesmen or other employees canvass the territory and make up a list of real prospects, and to get the information obtained into the hands of someone who will closely follow up the prospect for the purpose of selling equipment and making installations. It is suggested that this follow-up work can be done by the power salesmen of the central station company; by the contractor-dealers, as individuals, or through their local organizations where such exist; and by contact with manufacturers and jobbers' representatives who, the chairman reports, are showing great interest in the work. The details of carrying on such work in the different territories of course are left to the discretion of the vice-chairmen.

Clark Baker, chairman of the Light-in Bureau, Pacific Coast Electrical Association, and Pacific Coast representative of the National Lamp Works, has accepted the chairmanship of the educational committee for the Industrial Lighting Activity. He will organize a staff of specialists who will function throughout the Pacific Coast Division as instructors in industrial illumination, and also will arrange a program for the conduct of schools to which will be invited central station salesmen, jobber representatives, and salesmen of contractor-dealers.

The Edison Chorus, composed of employees and officials of the general offices of the Southern California Edison Company, Los Angeles. The group was the winner of the Metropolitan Eisteddfod Contest. The chorus has approximately seventy-five active members

Western Man Among Prospects for Power Commission Vacancy

The vacancy to be created by the resignation of O. C. Merrill as executive secretary of the Federal Power Commission has caused the names of a number of men to be mentioned as his possible successor. Prominent among these are F. E. Bonner, Dr. F. H. Newell, Paul S. Clapp and Herman Stabler.

Mr. Bonner is a district engineer of the Forest Service with headquarters in San Francisco. One-third of the Federal Power Commission's projects are in his district, and he has had long experience in the handling of water-power matters for the government.

Dr. Newell, an advocate of public ownership but in limited application, was connected with the Reclamation Service from 1902 to 1914 as chief engineer and later as director. He is a past president of the American Association of Engineers. Mr. Clapp, an active opponent of public ownership of electric utilities, has been connected with the Western Electric Company's engineering department, has done research work on the vacuum tube, and had an important part in the inauguration of transcontinental telephony. Mr. Stabler, an engineer with the Geological Survey, had charge of all matters related to the issuance and supervision of permits for water-power use of public lands for the Land Classification Branch of the Department of the Interior, which handled this work prior to the creation of the Federal Power Commission. He has been in close contact with the work of the Geological Survey related to the administration of the federal water-power act and is entirely familiar with Federal Power Commission practice.

New Cheap Power Rate for Large Customers in Portland

Affecting the Portland territory only of the Portland Electric Power Company and Northwestern Electric Company, a new reduced rate for large industrial power users was ordered by the Public Service Commission of Oregon effective Aug. 20, 1925. Under this schedule, which was not opposed by either company, a customer guaranteeing a minimum demand of 4,000 hp. will pay $27 per hp.-yr. for the highest 30-minute demand during the year. Service will be rendered at primary voltage, thus relieving the company of distribution investment and expense.

The investigation leading to the new rate order was undertaken by the Public Service Commission at the instigation of the Portland Chamber of Commerce. This body in its endeavor to attract to Portland industries using large blocks of power felt the need of a cheaper rate for this power, and hope has been expressed that the new rate will prove to be an inducement to such industries to locate there. Few of the present customers of either company are large enough users to avail themselves of the rate.

News of the Electragists

Women to Attend All Sessions of Southern Electragists

The Southern Division of the California Electragists will hold a quarterly meeting at Lebec on Oct. 16 and 17. The executive committee recently announced that the women will be invited to attend all conventions held by the Southern Division and further that they will be invited to attend all sessions of the members and take an active part in the business proceedings.

The merchandising committee appointed at the San Diego convention will present the report of its findings at this meeting. C. A. Rowley, The McNally Company, Pasadena, is chairman of this committee. O. N. Robertson, Robertson Electric Company, Santa Ana, will preside over the merchandising session.

Harold Ashton has opened a new radio and electric store at 1762 Colorado Street, Pasadena, under the name of Ashton's Radioelectric Store.

H. J. Wessel, Fresno; **D. E. Erickson,** Kingsburg; **Jim Baker,** and **Bakersfield Electric Company,** both of Bakersfield, contractors in the San Joaquin Valley, recently have become members of the California Electragists.

The Lake Electrical & Machine Company, 1257 Westlake Avenue, North, Seattle, has received the contract to furnish all new electric motors for the Hofius Steel & Equipment Company, Seattle, in its new plant. The contract includes 50 U. S. Electric Manufacturing Company's heavy duty ball-bearing motors, ranging in size from 2 to 50 hp.

B. R. Fritz, 710 Brockhurst Street, Oakland, Calif., recently acquired the business of the Electric Lighting Supply Company, formerly at 4000 Piedmont Avenue, Oakland, from his partners. He will continue to operate as an electragist.

Al Nicoll, probably one of the busiest men at the recent Electragists' convention at Eureka. On the job day and night

Mr. and Mrs. O. N. Robertson of Robertson Electric Company, Santa Ana, Calif. Mr. Robertson is chairman of the merchandising division of the California Electragists, Southern Division

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Queen City Electric Company, Denver, has taken over the motor repair and service department of R. S. Willoughby of the Silver State Electric Company, preparatory to Mr. Willoughby's engaging in the jobbing business in that city.

C. H. Whisler and **E. H. LaMarsna,** co-partners with **R. E. Rounsaville** in the firm of R. E. Rounsaville & Company, Tulare, Calif., recently have taken over the interests of Mr. Rounsaville in that firm and henceforth will operate under the firm name of the Tulare Electric Company.

The Santa-Hi Electric Company, 6781 Santa Monica Boulevard, Hollywood, Calif., formerly conducted by P. E. Braun and F. W. Redfield, is now operated by P. E. and G. J. Braun, the latter having recently purchased Mr. Redfield's interest.

The Westwood Electric Service Company, 11571 Santa Monca Boulevard, Sawtelle, Calif., has recently opened an electrical supply and contracting store. The business will be conducted by E. E. Holmes, a former local contractor and DeWitt Twaddell, formerly with the Southern California Edison Company.

Four Contractors Become Electragists Following Visalia Meeting.—The following electrical contractors applied for membership in the California Electragists following the quarterly meeting which was held in Visalia recently: **H. J. Wessel,** Fresno; **D. E. Erickson,** Kingsburg; **Jim Baker,** and **Bakersfield Electric Company,** both of Bakersfield.

H. S. Batchelder, for many years assistant to **Tracy Simpson** of the **Federal Sign System,** has started the **Standard Electric Sign Company** at 1047-B Mission Street, San Francisco.

Stanley R. Wilson has opened a store and sales room at 11207 Santa Monica Boulevard, Sawtelle, Calif., where he will feature electrical fixtures. Mr. Wilson formerly was associated with Beikel & Merigold of Los Angeles.

Electragist Appointed Commissioner of Los Angeles.—Frank McGinley, vice-president of the Southern Division of the California Electragists, recently was appointed commissioner of the Board of Building and Public Safety for the city of Los Angeles by the mayor. His term covers five years. The board consists of five members and has supervision over the building, electrical, and plumbing departments of the city of Los Angeles. All changes in ordinances or digression from the existing ordinances must come before this body for approval. Mr. McGinley is the proprietor of the Harbor Electrical Company, Wilmington, and always has been an active worker in civic affairs as well as in the Electragists' organization.

Robert D. Baer, formerly of the Pacific Coast sales staff of the Incandescent Supply Company of San Francisco, recently has opened a wholesale and retail electrical supply house at 2004 Brookiyn Avenue, Los Angeles, under the firm name of the Baer Electric Company. In addition to general electrical supplies, Mr. Baer is featuring electrical fixtures.

W. M. Moore, of the Moore Electric Company, recently opened a new and distinctive store in the lobby of the Alhambra Theater at 708 W. Main Street, Alhambra, Calif.

The Rollin M. Smith Engineering Company now is established in its new quarters in the Security Bank Building, 1007 West Santa Barbara Avenue, Los Angeles. The firm is equipped to render a complete electrical and architectural service.

Salt Lake Contractors and Dealers Meet Weekly.—The Electrical Development Association, which is the consolidation of the two former contractor and dealer associations in Salt Lake City, Utah, hold weekly meetings at the Elks Club on Tuesdays at 12:15 noon. All contractors and dealers are invited to their meetings.

Markson Electric Company, Los Angeles, recently moved into new quarters at 3936 S. Western Avenue, that city. In addition to the general line of appliances formerly carried, C. H. Markson has added a fixture department and a contracting department to his organization.

T. L. Hall, Pomona, Calif., was among the electragists who attended the annual convention of California Electragists recently held in Eureka. He was accompanied by Mrs. Hall.

J. M. Nightingale, Modesto, **A. K. Carson,** Bakersfield, and **E. E. Elzea** and **H. H. Courtright,** both of Fresno, were among the electragists from the San Joaquin Valley in attendance at the meeting of the California Electragists held in Eureka.

George R. Duncan, formerly representative of the General Electric Company in Oakland, recently has become a member of the staff of the Pacific Electric Motor Company in that city. Mr. Duncan will specialize on the development of electrical equipment among the industrial concerns in the East Bay territory.

H. I. Hartman recently opened the **Hartman Electric Service Company** at 5313 South Vermont Avenue, Los Angeles. Mr. Hartman was formerly associated with Hartman Brothers of that city. In addition to contracting, he will stock a complete line of appliances.

Meetings

Rocky Mountain Division N.E.L.A. Convenes

Reports from the annual meeting of the Rocky Mountain Division of the National Electric Light Association that is now in session at Glenwood Springs, Colo., states that a new record for attendance has been established. In addition to utility representatives and others interested in the electrical industry, there are present many newspaper men and city officials of the Mountain region.

The quarterly meeting of the Colorado Public Service Association also is being held at Glenwood Springs, so that city is the center of electrical interest in that section at the present time.

Detailed reports of both meetings will be published in the Oct. 1 issue of the Journal of Electricity.

"Rooster Chase" and "Laughing" Race Feature Denver Picnic

The electrical family of Denver, 1,500 strong, had its annual midsummer holiday Aug. 6 when the fifth annual picnic of the Electrical Cooperative League was held in that city.

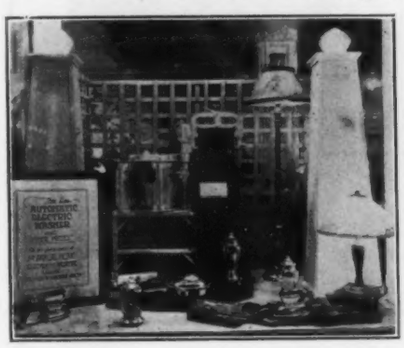
There was every evidence to indicate that the recent affair was a record-breaker in more ways than one. In addition to the big crowd there was said to be a larger number of prizes than at any of the previous picnics., aggregating in value about $700.

A ball game was the curtain-raiser on the program, and the utility nine headed by O. L. Mackell squeezed in the winning tally after an extra inning had been required to break the tie with a team composed of members of the other branches of the industry.

Sixteen events were listed on the afternoon sports program, including a number of novel events for the women, chief of which was a "rooster chase" with three game white cockerels as the quarry. In a special event for Advisory Board members F. F. McCammon of the Public Service Company of Colorado, was declared by the crowd to be the best "laugher." Ross Adams and L. M. Cargo won the golfing events.

All of the prizes for the picnic were contributed by members of the league and friends outside of the industry, according to S. W. Bishop, league manager. They ranged from a flashlight to a washing machine, the latter offered by the Automatic Electric Washer Company.

The committees were headed by E. P. Kipp, Clarence Keeler, K. L. Francis, A. E. Bacon and W. R. Kaffer.



A display of the prizes, donated by members and awarded at a recent picnic of the Electrical Cooperative League of Denver, on display in the window of the Public Service Company of Colorado

P.C.E.A. Technical Section Meet in Los Angeles Sept. 23-25

A conclave meeting of the Technical Section of the Pacific Coast Electrical Association will be held in Los Angeles Sept. 23-25, 1925, at the Los Angeles Gas and Electric Corporation Building, 810 South Flower Street.

The schedule of committee meetings follows:

Committee	Wed.	Thurs.	Friday
Accident Prevention	10 a.m.	9:30 a.m.	
Electrical Apparatus		9:30 a.m.	9:30 a.m.
Hyraulic Power	10 a.m.	9:30 a.m.	
Inductive Co-ordination			9:30 a.m.
Meters	10 a.m.	9:30 a.m.	
Overhead Systems	10 a.m.	9:30 a.m.	
Prime Movers	10 a.m.		
Safety Rules			9:30 a.m.
Underground Systems			9:30 a.m.
Executive Committee	6 p.m.		6:00 p.m.
Luncheon Meeting		12:15 p.m.	

Headquarters of the Section will be at the Hotel Gates, Sixth and Figueroa Streets.

COMING EVENTS

Association of Electragists, International—
Annual Convention—West Baden, Ind.
Sept. 23-25, 1925

Technical Section, P.C.E.A.—
Conclave Meeting—Los Angeles, Calif.
Sept. 23-25, 1925

Electrical Supply Jobbers Association—Pacific Division—
Quarterly Meeting—Hotel Del Monte, Del Monte, Calif.
Sept. 24-26, 1925.

California Association of Electrical Inspectors—
Semi-Annual Meeting—Fresno, Calif.
Sept. 24-26, 1925.

California Electragists, Southern Division—
Quarterly Meeting—Lebec Inn, Lebec, Calif.
Oct. 16-17, 1925

Inspectors to Discuss Code and Safety Orders at Meeting

The 1925 edition of the Electrical Safety Orders of the Industrial Accident Commission of California and the 1925 edition of the National Electrical Code will be subjects of paramount importance that will be discussed at the semi-annual meeting of the California Association of Electrical Inspectors which will be held in Fresno, Sept. 24-26. Copies of the Safety Orders and the Code will be distributed to the members attending. Uniform interpretations of these rules will be arrived at during the convention.

Advance proofs of the revised rules of the Board of Fire Underwriters regarding theater and motion picture wiring will be sent to all members in advance of this meeting so that they may be brought up for discussion.

Copies of the uniform electrical ordinance as recommended by the law committee of the Electrical Manufacturers' Council will be distributed at the sessions.

The meetings of the Association will be held in the San Joaquin Light & Power Corporation Building, and the Hotel Fresno will be headquarters for the convention.

General Electric Company, Schenectady, N. Y., has issued recently bulletin No. 48937.1 entitled "Automatic Arc Welding", which gives a resume of the uses and value of automatic arc welding, together with a description of the welding apparatus and generating equipment used.

Book Reviews

ELECTRICAL MACHINERY ERECTION

By TERRELL CROFT, Consulting Engineer, Directing Engineer of the Terrill Croft Engineering Company; 314 pages; $3. McGraw-Hill Book Company, Inc., New York, N. Y.

As the title indicates, this book treats the subject of the erection of electrical machinery and deals with the mechanical rather than the electrical features of installation work.

The text is written in the characteristically straightforward manner of the author and from the practical man's standpoint, as the author states, "for the fellow who must install the equipment."

It is obviously not a technical book. The endeavor has been to convey the facts graphically, that is, by means of illustrations, of which there are more than 300.

The text is divided into five divisions, and each division is further divided into numbered paragraphs to afford the proper segregation of subjects. The opening division discusses unloading and moving electrical machinery. This is followed by a section devoted to supporting electrical machinery that describes and explains how to arrange and construct wall ceiling, floor supports, and foundations.

Erecting electrical machinery is covered in the third division. The methods which may be employed in getting the unit or its components from the floor onto the supports and into position for alignment are explained in detail.

Locating and fixing is covered in the fourth section. This explains how the machine may be properly aligned, bolted down, and grouted in.

Mechanical maintenance, with particular reference to bearings, is included in fifth division. Bearing troubles and remedies for the same are discussed in detail.

One good feature of the book is the group of questions that is given at the end of each section. Other features are the tables which may be found in the various sections dealing with such topics as, the strength of materials used in erecting, correct temperatures for pouring bearings, organization of the electrical personnel, and the like.

This book should serve its purpose well and prove of value to any electrician or erecting machinist.

Personals

T. F. McDonough, former Seattle district representative of the Benjamin Electric Company, has been transferred to the San Francisco branch of the company. He has been succeeded in Seattle by **T. W. Carlson.**

A. E. Garland of Garland-Affolter Engineering Corporation, San Francisco, has departed on a three weeks trip to the East where he will visit factory connections.

Herbert Rose, southern California representative of the Federal Electric Company, and president of the San Diego Electric Club, has resigned his position with the Federal company to take charge of the radio department recently created by the Holzwasser company, a San Diego department store. No successor to Mr. Rose has been announced by the Federal company.

A. J. Lutz of the Pacific States Electric Company, Seattle, lately returned from an Eastern trip.

J. B. Black, vice-president and general manager, Great Western Power Company, San Francisco, recently left for New York where he will confer with officials of the Western Power Corporation.

D. E. Harris, president, Pacific States Electric Company, San Francisco, has been elected a director of the Pacfic National Bank of that city, succeeding the late Tracy E. Bibbins.

E. C. Magruder, special representative of the Meadows Manufacturing Company, Bloomington, Ill., who has been spending some time in San Francisco, recently visited the California State Fair at Sacramento. **C. A. Williams,** Western sales manager for the same company, also attended the fair.

Dr. W. R. Whitney of the research laboratories of the General Electric Company of Schenectady, N. Y., was a Seattle visitor recently.

P. B. Lockwood has been made manager of the Walcherson Electric Sales Company, San Francisco, northern California distributors of the Meadows washer, the America cleaner and the York ironer.

E. P. Kipp, Clarence Keeler, K. L. Francis, A. E. Bacon and **W. R. Kaffer** headed the committees in charge of the recent enjoyable picnic held by the Electrical Cooperative League of Denver.

G. W. Cole, heavy-duty equipment specialist of the Edison Electric Appliance Company, Inc., San Francisco, is planning a trip to San Diego, Calif., shortly in connection with his work.

A. L. Spring, formerly merchandise specialist for the General Electric Company, Los Angeles, has been made regional specialist of the company's merchandising division in that city.

J. R. Geary, representative of the General Electric Company, Tokyo, Japan, was a recent visitor in San Francisco.

E. J. Barnes and **R. A. Rowlands,** of the General Electric Company of New York, recently spent several days in San Francisco.

F. C. Webber, president of the Synchronous Club of Los Angeles, recently visited San Francisco and vicinity.

Robert Miller, who for the past five years has been local manager of the General Electric Company at Salt Lake City,has been appointed manager of the Rocky Mountain district of that concern, with headquarters in Denver. He succeeds H. D. Randall, transferred to other duties at the main offices of the company at Schenectady, N. Y. Mr. Miller's new duties give him authority over company affairs in half a dozen western states and supervision of radio broadcasting station KOA, owned and operated by the General Electric Company. Mr. Miller has been in the employ of the General Electric Company more than twenty-five years. He entered its service in an unimportant capacity and gradually rose to his present position, having filled numerous positions in the laboratories, engineering and commercial departments in the meantime. Mr. Miller is a member of the American Institute of Electrical Engineers, the National Electric Light Association, and the Society for Electrical Development, Inc. He has been prominently identified with the Rocky Mountain Committee on Public Utility Information and the Electrical League of Denver.

ROBERT MILLER

N. W. Paterson is now northern California agent for **W. W. Kirk,** who is the representative of Delta-Star Electric Company and Niagara Electric Improvement Corporation on the Pacific Coast.

H. H. Singletary, engineer in the electric truck bureau of the Pacific Gas and Electric Company, San Francisco, recently was elected secretary-treasurer of the Electric Transportation Association.

B. F. Pearson, manager of the industrial relations department of the Southern California Edison Company, Los Angeles, recently addressed the Rotary Club of Pomona, Calif. His address related to labor troubles and other conditions observed by him in his recent European trip.

Ernest Kipp, representing the Hazard Manufacturing Company, Denver, recently visited Pacific Coast cities in the interests of his firm.

R. G. Gentry, associated with the Public Service Company of Colorado, Denver, recently visited the properties of the company.

J. P. Sprunt, Jr., representative of the Westinghouse Electric Company, Denver, Colo., was a recent visitor in San Francisco.

A. C. Pietrick, electrical engineer formerly with the Northern States Power Company at Cleveland, Ohio, has taken up his residence in San Diego and now is connected with the G. Ivan Peoples Company of that city.

G. C. Tenney, managing editor of the Journal of Electricity, San Francisco, shortly departed for Salt Lake City enroute to the annual convention of the Rocky Mountain Division of the N.E. L.A. to be held at Glenwood Springs, Colo. While in that section he will visit Denver also.

Wellington Rupp, electrical engineer with the Washington State Department of Public Works since 1921, has been made chief engineer for the department. He succeeds **J. W. Carey,** who has resigned, effective Sept. 14, to engage in private engineering practice in Seattle. **M. E. Clark,** formerly assistant engineer with the department, has been promoted to assistant chief engineer.

E. O. Shreve, district manager, General Electric Company, San Francisco, recently returned from an extended Eastern trip.

Phil Apfel, president of the Electric Heating & Manufacturing Company, Seattle, recently went to Washington, D. C., in connection with a proposed heating contract for some government buildings.

J. W. Otterson, for the past three years a member of the editorial staff of the Journal of Electricity, has been appointed to the position of business manager to fill the vacancy caused by the resignation of C. M. Lindsay. Mr. Otterson was born in Wallace, Idaho, and educated in the schools of that state and California. He attended the University of California and was graduated from the College of Commerce with the degree of B.S. He majored in advertising and marketing. Following his graduation he entered the employ of H. S. Crocker, Inc., printers and stationers, San Francisco, in the printing sales department. He joined the staff of the Journal of Electricity in September, 1922, as assistant editor. In June, 1924, he was promoted to the position of associate editor. His work on the editorial staff has been connected largely with the merchandising branch of the electrical industry. He has played a prominent part in the activities of the San Francisco Electrical Development League and the commercial section of the Pacific Coast Electrical Association.

J. W. OTTERSON

George Erich, Seattle representative of the Federal Electric Company, has planned a trip to Chicago by way of San Francisco.

T. E. Downs, formerly in the appliance department of the Puget Sound Power & Light Company, Seattle, has resigned to take over the Washington district of Rathbone-Sard & Company, distributors of Acorn electric ranges. Mr. Downs has been succeeded by **T. A. Marden.**

W. W. Allen, sales manager of the Electric Corporation, Seattle, recently spent two weeks in Los Angeles, his former home town.

C. M. Lindsay has resigned his positions as vice-president, secretary and treasurer of the McGraw-Hill Company of California to engage in business for himself in San Jose, Calif. Mr. Lindsay was graduated from the Armour Institute with the degree of B.S. in electrical engineering. A short time after leaving college, he went to California and became identified with the Hotpoint Company at Ontario as assistant to H. A. Lewis, who at that time was general sales manager. Mr. Lindsay's work was sales organization and sales promotion, and through this he gained a wealth of experience that stood him in good stead later on. When the Hotpoint Company was purchased by the Edison Electric Appliance Company Mr. Lindsay joined its staff in Chicago as sales promotion manager, a position which he held until he was invited to join the McGraw-Hill Company, Inc., as assistant to H. A. Lewis, business manager of Electrical Merchandising. A short time after the McGraw-Hill Company purchased the Journal of Electricity Mr. Lindsay went to California as business manager of that paper and also secretary and treasurer of the McGraw-Hill Company of California. In 1922 the title of vice-president was given to him in recognition of the value of his services. Mr. Lindsay has taken a keen interest and played a prominent part in the affairs of the electrical industry on the Pacific Coast. For nearly two years he has been secretary and treasurer of the San Fraincisco Electrical Development League, and has been especially interested in the problems of the contractor-dealer. In severing his connection with the McGraw-Hill Company Mr. Lindsay

C. M. LINDSAY

carries with him the respect and esteem of all of his associates and their cordial good wishes for the greatest success in his new undertaking.

B. C. J. Wheatlake, formerly manager of the central station department of the General Electric Company at Denver, has been appointed to succeed Robert Miller as local manager of that company at Salt Lake City, Utah. Mr. Wheatlake started work with the General Electric Company July 1, 1910, spending approximately one year on the test course and one year in transformer designing. He went to the Denver office of the company in 1912 as transformer specialist. He later was made manager of the supply department,and for the last four years has been manager of the central station department. For the last ten years Mr. Wheatlake has been very much interested in the activities of the American Institute of Electrical Engineers. He

B. C. J. WHEATLAKE

was president of the local section at Denver three years ago, and twice has represented the Denver section as delegate to the national convention. While in Denver he took an active interest in the Electrical Cooperative League and also the Rocky Mountain Committee on Public Utility Information. Mr. Wheatlake has written a number of papers on electrical development subjects.

William Baurhyte, president, Los Angeles Gas and Electric Corporation, and president of the Pacific Coast Electrical Association, is planning to attend the meeting of the National Executive Committee of the National Electric Light Association, which will be held in Chicago, Ill., Oct. 26-27.

Samuel Taylor, secretary of the Pacific Coast Electrical Association, will be one of the members of that organization attending the meeting of the National Executive Committee of the National Electric Light Association, which will be held in Chicago Oct. 26-27.

Robert Miller, manager of the General Electric Company, Denver, has returned to that city after a series of conferences in the East with company officials.

C. W. Burkett, formerly chief engineer, Pacific Telephone and Telegraph Company, recently has become consulting engineer for that company.

C. E. Flager has been appointed chief engineer of the Pacific Telephone and Telegraph Company to succeed **C. W. Burkett.**

E. N. Bryan, formerly office engineer with the California Division of Water Rights, has been appointed chief deputy of the division.

Obituary

Harry W. Reilly, formerly active in construction work for the Western Byllesby organizations, the Western States Gas & Electric Company and the San Diego Consolidated Gas & Electric Company, and well known throughout the industry in the West, died at the home of his sister in Milwaukee, July 23. At the time of his death he was assistant to the vice-president in charge of operations of the Oklahoma Gas & Electric Company. Mr. Reilly was identified particularly with Western activities about the time of the acquisition of the Western States properties by the Byllesby company. Coming to Stockton from San Diego, where he had supervision of the big construction program at that property in 1912-13, Mr. Reilly conducted the valuation of the Western States Gas & Electric property, rebuilt the two systems serving Stockton into one system, installed its underground system and made extensive improvements to the gas plants. At San Diego he also installed the first underground system, aided in the extension of the first line from San Diego to connect with the Edison company lines at Capistrano, and other major construction activities. He left San Diego for Oklahoma in 1917, leaving behind him a host of friends and admirers. Harry Reilly was a native of Albany, N. Y., graduated from the University of Wisconsin with a degree in electrical engineering in 1897, and was active in engineering for some years before joining the Byllesby construction organization in 1910.

T. H. Foley, vice-president and general manager of the Bend Water, Light & Power Company, Bend, Ore., died Aug. 16, 1925, from injuries received in an automobile accident Aug. 15. Mr. Foley came to Bend in 1910 as a lineman. He soon showed a capacity for a larger usefulness in the light and power industry and advanced through the position of superintendent to be manager of the then small town electric plant. Enlarging the operations of his company always well in advance of the growth of the city, Mr. Foley developed what is considered to be one of the most progressive small utility properties in the West. When the American Power & Light Company acquired the property in 1924, Mr. Foley was retained as vice-president and general manager.

John Edgar Miller, father of John B. Miller, president of the Southern California Edison Company, died at his home in Pasadena, Calif., Sept. 7, of heart failure, at the age of seventy-nine. Mr. Miller was a native of Michigan and for the last sixteen years had been a resident of Pasadena. For a great many years he had been associated with the Pacific Mutual Life Insurance Company. He is survived by two sons, John B. Miller, president of the Southern California Edison Company, and Frank E. Miller; a daughter, Miss Clara Miller, and his widow, Mrs. Sarah Miller. E. G. Miller, a grandson, is treasurer of the Southern California Edison Company.

TRADE NOTES

Charles Cory & Son, Inc., New York City, has accepted the exclusive manufacturing and selling rights of Kent's clear view screens for the United States and Canada. It is claimed that the merits of the screen have been proved completely in shipping, railway locomotives, yachts, high-speed power boats, aeroplanes and automobile application. The screens consist of a polished glass disc rotated on a central bearing by an electric motor at such speed that rain, spray and snow are dispersed instantly and complete transparency is maintained in all weather and clutches.

The Advance Machinery & Supply Company, Denver, Colo., has issued a new bulletin entitled "A Long Step Forward", which describes the Advance stoker, giving details of operation and advantages of its use.

Crouse-Hinds Company, Syracuse, N. Y., has issued recently a folder illustrating in actual size its screw cover junction condulets and giving description and dimensions of the condulet.

The French Battery & Carbon Company, Madison, Wis., has announced a refinancing plan and renaming of its concern to the **French Battery Company.** It will increase its stock greatly and expand its plant, including enlarged warehouse facilities and equipment.

Harvey Hubbell, Inc., Bridgeport, Conn., recently has put on the market a new line of porcelain outlet receptacles for use with either 3¼-in. or 4-in. outlet boxes on metal ceilings and concrete or tiled walls.

The Master Electric Company, Dayton, Ohio, has issued recently a new folder entitled "Master Quality with Service", which fully describes and illustrates its Master superpower repulsion induction motors and calls attention to all its special features.

A. J. Lindemann & Hoverson Company, Milwaukee, Wis., manufacturers of L & H electric ranges and appliances, has placed on the market a new electric waffle iron. It is of square colonial design, which it is claimed makes extra large waffles. The iron is made of brass with a heavy highly polished nickel finish.

Square D Company, Detroit, Mich., has announced recently a new type of power panel, which it is claimed is very compact, making it possible to keep the cabinet dimensions comparatively small.

Paul W. Koch & Company, Chicago, Ill., has developed a new "Jiffy" solder dipper, which solders pig-tail joints and tin cable ends without the necessity of constant use of the blow torch. It will not burn the insulation nor cause it to melt and run, and it is claimed to be a valuable labor-saving device.

Herman H. Sticht & Company, New York City, has issued bulletin No. 130, describing two types of the Model "D" Standco megohmers.

Wagner Electric Corporation, St. Louis, Mo., has published recently a pocket-sized booklet containing fifty questions and answers relating to power-factor.

Gisholt Machine Company, Madison, Wis., has placed a new type of balancing machine on the market which it is claimed is designed especially for short work, such as flywheels, pulleys, fans and clutches.

Cutler-Hammer Manufacturing Company, Milwaukee, Wis., has added new single and double-flash receptacles to its C-H wiring device line.

Century Electric Company, St. Louis, Mo., has issued recently a new folder describing and illustrating its refrigeration motor for household refrigerating machines.

Chicago Fuse Manufacturing Company, Chicago, Ill., has developed a new design of "Union" renewable knife blade fuse, which, it is claimed, makes the fuses exceptionally simple in design and construction.

Who was that umpire? Why, Don Ray, himself —not a moving picture.

The Johns-Pratt Company, Hartford, Conn., has issued an announcement regarding its Noark underground boxes and points out the important advantages of its product.

Monitor Controller Company, Baltimore, Md., has issued recently a profusely illustrated booklet, giving a complete description of its automatic equipment for the control of newspaper and magazine printing presses and paper calendering machines. The booklet also gives an interesting historical sketch of the development of newspapers and newspaper printing.

Roller-Smith Company, New York City, has issued bulletin No. 530, which is descriptive of its non-closable on overload circuit breakers.

Detroit Stoker Company, Detroit, Mich., has issued bulletin No. 1018, a 32-page issue, describing its Detroit underfeed stokers of the single retort type. It is claimed that among other items of outstanding interest to combustion engineers the bulletin contains a number of fuel bed cross-sections, showing conditions of the fire with respect to air distribution and movement toward the dumps.

The Fem Company, Portland, Ore., is announcing the advantages attributed to its electric washer, which it is claimed is the only piston electric washer on the market. The machine is described fully in a recently issued folder.

Harold E. Trent, Philadelphia, Pa., has developed a new soldering iron appliance for heavy work that it is claimed has characteristics that never before have been achieved in this class of apparatus, as it has the ability to heat up to soldering temperature and to maintain that temperature indefinitely.

Capitol Stage Lighting Company, New York City, has issued recently two complete catalogs, giving prices and descriptions of its theater equipment. The catalogues are well illustrated.

The Kuhlman Electric Company, Bay City, Mich., has appointed the **Stevens Sales Company,** 134 West Second South Street, Salt Lake City, Utah, as district representative for the state of Utah and parts of Idaho and Nevada, adjacent to Utah. The Stevens Sales Company will handle Kuhlman power, distribution and street lighting transformers.

The Electric Controller & Manufacturing Company, Cleveland, Ohio, has issued recently bulletin No. 1042-E, which gives a complete description of the E C & M automatic compensators for a.c. squirrel-cage motors.

Reynolds Electric Company, Chicago, Ill., has issued recently bulletin No. 801, describing special control devices which it makes. The same include timers for traffic signals and special flashers of various descriptions.

Elwell-Parker Electric Company, Cleveland, Ohio, has placed on the market a new tool, designed for the sheet and tin plate industry. The unit is driven by electric motor, receiving power from battery carried.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued a descriptive and illustrated booklet entitled "Bright Streets are Busy Streets,", by L. A. S. Wood, manager of the street lighting section of the company. The book covers the advantages of better street lighting.

Manning-Bowman & Company, Meriden, Conn., are demonstrating the advantages of their M-B waffle irons in their new announcements. The M-B Hotakold vacuum bottle with its new handle and larger cups is also featured.

Anderson-Pitt Corporation, Kansas City, Mo., is introducing a new type of electric heater in which all the coils face the reflector, by which principle it is claimed no heat is wasted.

General Electric Company, Schenectady, N. Y., recently has changed its demand meter known as the Type G. The stylus actuating mechanism of the redesigned meters equipped with a totalizing register, thus providing a means of checking the number of impulses recorded by the demand meter against the reading of the watthour meter, is among one of the changes featured.